THE AMERICAN ANNUAL
of PHOTOGRAPHY and
PHOTOGRAPHIC TIMES ALMANAC
for 1899

THE SOLOGRAPH

Copyright, 1891, By B. J. FALK.
LITTLE MINNIE. By B. J. FALK.

THE **Solograph** and **Henry Clay** Series of Folding Hand Cameras

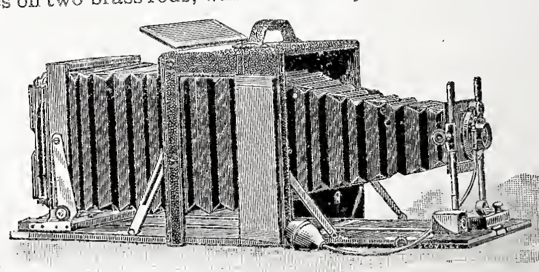
have been designed for the Amateur Photographer, not the imitator who carries a camera as a sort of fad.

The following cameras, each in the respective work for which it has been designed, will respond to the natural ambition of the genuine amateur to produce photographs of a high order of artistic merit.

"FLO." By G. E. VALLEAU.

ONG FOCUS
Reversible Back Solograph.

The name of this camera is is in itself a description of the instrument. It is a Solograph camera, designed for the more advanced amateur photographers, who feel the necessity of combining in one instrument, in a practical way, the features which are requisite for almost universal application, this without materially increasing the bulk, weight and price of the apparatus. The Long Focus Reversible Back Solograph resembles the regular Solograph. It is of the same high grade of workmanship, made of selected mahogany, well dovetailed throughout, with French hand polish. Its brass trimmings and adjustments are all hand-made, possessing the neatness and accuracy which, for the same reason of being hand-made, the Swiss watches possess. It has a double swing-back swinging from the center, rack and pinion movement, reversible finder with hood to screen the visual. It also has a front that may be raised, lowered, or slid to either side, as the foreground should require. The front operates on two brass rods, which allow any desirable latitude in adjusting the foreground in the picture. As the name indicates, it has a reversible back, which adjustment is of the greatest importance when the camera is used on the tripod, the position of the plate being readily changeable without moving the camera. It has *a greater focal capacity* than any other similar camera



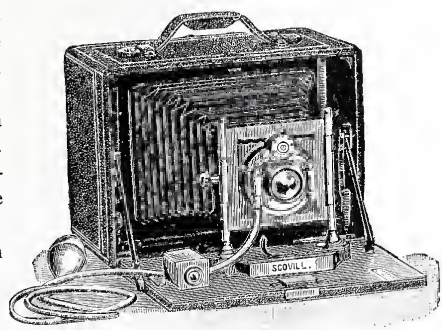
on the market. It is the only camera of this style which has patented independent bellows for back and front draw with an ingenious device to support the bellows in the center, so as to keep them from sagging, which is one of the greatest defects in all other cameras.

This camera is of inestimable advantage for photographing surgical operations, where it is necessary to obtain as large an image as possible.

For the use of long focus lenses—for copying, enlarging, and all other purposes requiring an extended length of bellows, the Long Focus Reversible Back Solograph is particularly well adapted.

The Lens is the Solograph Rapid Rectilinear. Being symmetrical, the front combination may be removed and the rear lens used alone, which practically doubles the focus. For mountain scenery and subjects at long range, this is often an advantage, as the objects in the view appear larger in the picture.

The new Unicum Shutter having a triplicate movement, with Iris Diaphragm, Pneumatic and Finger Release, is furnished with the Long Focus Reversible Back Solograph, and forms a prominent part of the outfit. It works between the lenses without noise or jar, and may be adjusted for time exposures as well as for rapid instantaneous work.



The View Finder is located in a convenient position on the bed. The ground glass screen is spring-actuated, receding to permit the insertion of the plate holder.

Glass Plates, Cut and Roll Film may all be used. Combining the desirable features of both hand and view cameras, the Long Focus Reversible Back Solograph Camera will appeal to and be fully appreciated by a very large class of both amateur and professional photographers.

When in doubt as to the best camera made, compare the SOLOGRAPH with any other on the market.

FOCAL CAPACITY OR LENGTH OF BELLOWS:

4 x 5	5 x 7	6½ x 8½	8 x 10
19½ inches.	26 inches.	32 inches.	35 inches.

The price includes Camera, Lens, Shutter, and one Double Plate Holder.

PRICES:

	4 x 5	5 x 7	6½ x 8½	8 x 10
Long Focus Reversible Solograph.	$45.00	$55.00	$65.00	$75.00
Extra Plate Holders, - - -	1.00	1.25	1.50	1.75
Cartridge Roll Holder, empty, -	5.00	6.50	12.00*	
Leather Covered Case, - - -	2.50	3.00	3.50	4.00
Sole Leather Case, - - -	3.50	4.00	4.50	5.00

* Not made for Cartridge Film.

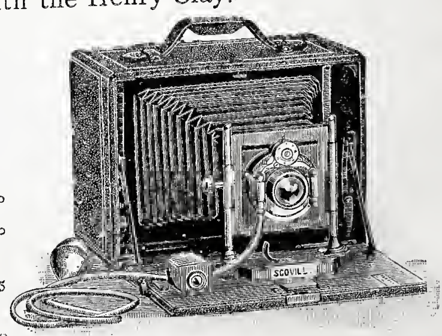
THE SOLOGRAPH

A Yorkshire Fisher Lassie.
By J. Cruwys Richards.

IS an essentially high grade camera, but in its construction the least weight and volume have been equally important aims with other desiderata. This camera has a double swing back swinging from the center, rack and pinion movement, reversible finder with hood to screen the visual; it also has a front that may be raised, lowered, or slid to either side as the foreground should require. The front operates on two brass rods. The camera is fitted with a double rectilinear lens with Unicum shutter. The shutter is exactly the same as the one furnished with the Henry Clay.

PRICE:

	4 x 5	5 x 7
Complete, with Lens, Shutter, and one Dry Plate Holder,	$35.00	$45.00
Without Lens or Shutter, -	23.00	27.00
Double Dry Plate Holders, each - - - - - -	1.00	1.25
Leather Case and Shoulder Strap, - - - -	2.00	2.50

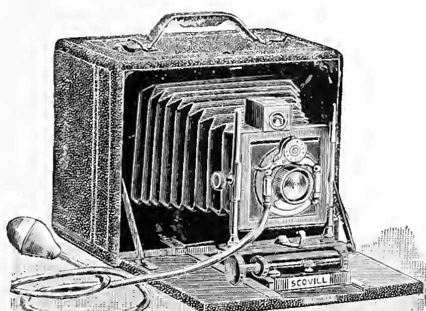


Homeward Bound. By Joseph Cottier.

THE HENRY CLAY CAMERA,

which is well-known as the highest grade folding camera in the market, has been remodeled, so as to conform to the popular idea of lightness and compactness, yet preserving the essential features which have maintained for the Henry Clay Camera the claim of superiority over all others in the market, this, notwithstanding the fact that it is the pioneer folding camera.

It is impossible to write a description of this camera which will do it even partial justice, as its superiority depends largely on the general workmanship. A camera may be described as having a swing back, but of what utility is such a swing if the mechanical device is of so complicated a nature, and of construction so faulty that it is rendered completely useless in practice. This is the case with most cameras on the market advertised as having swing backs. The Henry Clay Camera has a back swinging from the center, which is the true scientific principle, and the mechanical device is so simple and so accessible that the aim of the swing is effectively carried out. The same is the case with the rack and pinion movement for fine and accurate focus, the rising and swing front, and all other points which enter into the combination of a perfect camera.



The Henry Clay Camera has a draw bellows of about 12 inches, and in the 5 x 7 size measures, 5½ inches wide, 7½ inches high, and 9 inches long, and weighs less than 5 pounds. The distance allowed between the front of the outside case of the camera and the lens board, is such as to permit of almost any lens being used with it, especially the desirable *Goerz anastigmatic lenses*. The front, or platform of camera, is so constructed that it is easily unlocked and dropped down to admit of the use of a very short focus and extremely wide angle lens.

The camera is sold with or without lens, but the lens which completes the instrument is a high class double rapid rectilinear lens made by the Bausch & Lomb Optical Company, fitted with the latest production of this factory in the way of a shutter.

PRICE:

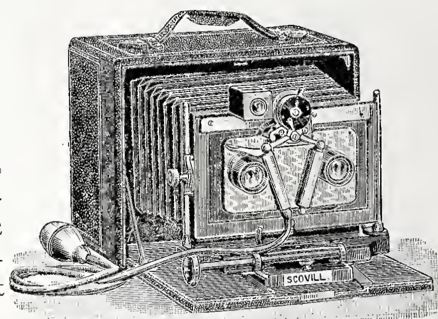
	4 x 5	5 x 7
Complete, with Lens, Shutter, and one Dry Plate Holder,	$40.00	$50.00
Without Lens or Shutter, - - - - - - -	28.35	35.00
*With Goerz Double Anastigmatic Lens, Series III, and Bausch & Lomb Diaphragm Shutter, - - - -	80.00	100.00
Double Dry Plate Holders, each, - - - - - - -	1.00	1.25
Leather Case and Shoulder Strap, - - - - -	2.00	2.50

* No. 3 for 5 x 7 and No. 1 for 4 x 5.

HENRY CLAY Stereoscopic Camera

A MODERN HAGAR. By EDWARD SWINGLER.

The Henry Clay Camera is also made with stereoscopic front fitted with a pair of double rectilinear lenses, combining a Bausch & Lomb stereo shutter. It is well known that of all pictures those which are arranged to give the stereoscopic effect, when viewed in a stereoscope, convey the true impression of perspective and solidity. It seems strange indeed, that of the myriads of instantaneous pictures made, so few are taken with a view to their future use in the stereoscope, FOR IT IS ONLY BY THAT MEANS THAT THE IDEA OF PERSPECTIVE AND SOLIDITY CAN BE CONVEYED. We can only assign as a reason the present almost universal use of hand-cameras, and that none of them have, up to this time, been arranged satisfactorily for stereoscopic pictures.

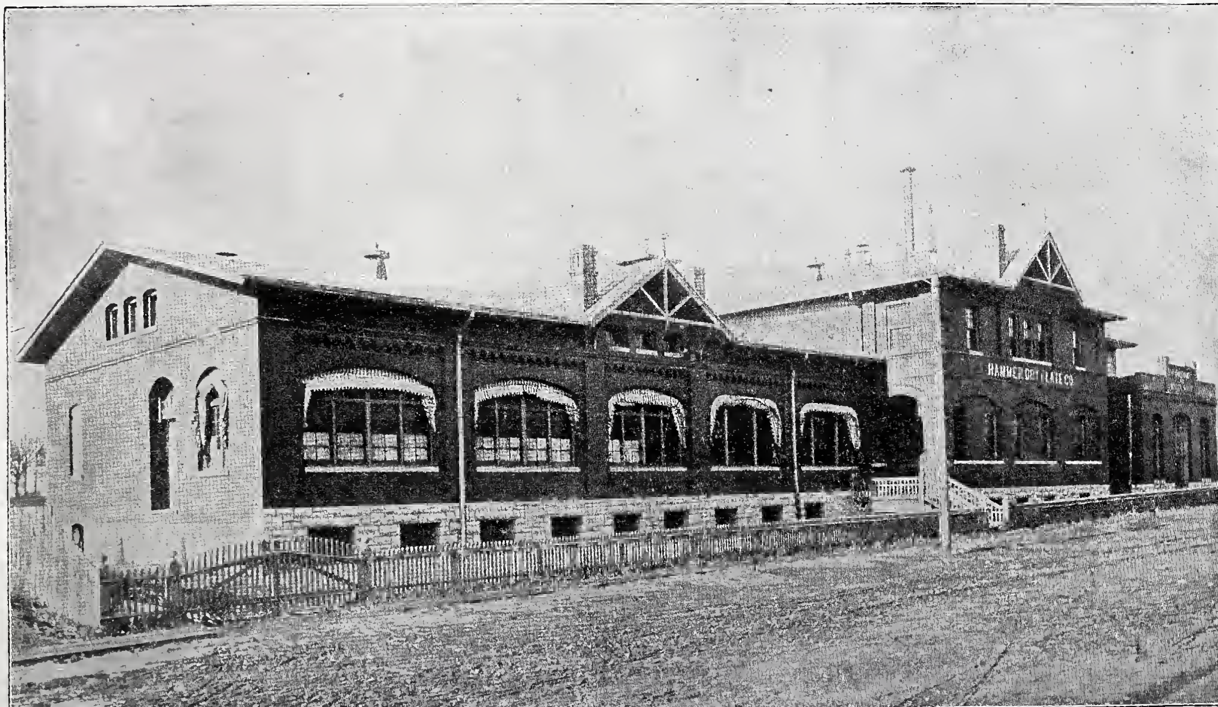


The price of this camera includes a 5 x 7 Double Rapid Rectilinear lens with Unicum Triplicate Shutter.

PRICE:

	5 x 7
Complete, with a pair of Double Rectilinear Lenses, fitted with Bausch & Lomb Stereoscopic Shutter, - - - - - -	$80.00
Without Lenses or Shutter, - - - - - - - -	40.00
Double Dry Plate Holders, each, - - - - - - -	1.25
Leather Strap and Shoulder Strap, - - - - - -	2.50

A LEADING DRY PLATE FACTORY IN AMERICA.



WHERE HAMMER PLATES ARE MADE.

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GRAVURE-PHOTOCHROME ENG. CO. N.Y.

ZILETTA.
By F. H. Day.

The American Annual of

Photography

and

Photographic Times

Almanac

for 1899

Edited by

Walter E. Woodbury,

Editor of

The Photographic Times.

The Scovill & Adams Company

of New York.

PHOTO. TIMES PRINT.

PREFACE.

THE present volume is the thirteenth of the series. The generous response to our request for articles and pictures has resulted in a volume by no means inferior to its predecessors. We take this opportunity to thank the many kind friends who have assisted us.

Owing to lack of space many interesting articles and pictures were crowded out. These will appear in the pages of The Photographic Times.

THE EDITOR.

NEW YORK, 1898.

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JANUARY, 1899.

1st MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
1	**1**	S	7 25	4 43
2	**2**	M	7 25	4 44
3	**3**	Tu	7 25	4 45
4	**4**	W	7 25	4 46
5	**5**	Th	7 25	4 47
6	**6**	F	7 25	4 48
7	**7**	Sa	7 25	4 49
8	**8**	S	7 24	4 50
9	**9**	M	7 24	4 51
10	**10**	Tu	7 24	4 52
11	**11**	W	7 24	4 53
12	**12**	Th	7 23	4 54
13	**13**	F	7 23	4 55
14	**14**	Sa	7 23	4 56
15	**15**	S	7 22	4 57
16	**16**	M	7 22	4 59
17	**17**	Tu	7 21	5 00
18	**18**	W	7 21	5 01
19	**19**	Th	7 21	5 02
20	**20**	F	7 20	5 03
21	**21**	Sa	7 19	5 04
22	**22**	S	7 18	5 05
23	**23**	M	7 17	5 07
24	**24**	Tu	7 17	5 08
25	**25**	W	7 16	5 09
26	**26**	Th	7 16	5 10
27	**27**	F	7 15	5 11
28	**28**	Sa	7 14	5 13
29	**29**	S	7 13	5 14
30	**30**	M	7 12	5 15
31	**31**	Tu	7 12	5 16

Moon's Phases.

Last Q., Jan. 4, 10 h. 21 m., eve.
New M., Jan. 11, 5 h. 49 m., eve.
First Q., Jan. 18, 11 h. 36 m., morn.
Full M., Jan. 26, 2 h. 34 m., eve.

FEBRUARY, 1899.

2d MONTH. 28 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
32	**1**	W	7 11	5 18
33	**2**	Th	7 10	5 19
34	**3**	F	7 09	5 20
35	**4**	Sa	7 07	5 21
36	**5**	S	7 06	5 22
37	**6**	M	7 05	5 23
38	**7**	Tu	7 04	5 25
39	**8**	W	7 03	5 26
40	**9**	Th	7 02	5 27
41	**10**	F	7 01	5 28
42	**11**	Sa	7 00	5 30
43	**12**	S	6 58	5 31
44	**13**	M	6 57	5 32
45	**14**	Tu	6 56	5 34
46	**15**	W	6 55	5 35
47	**16**	Th	6 53	5 36
48	**17**	F	6 52	5 37
49	**18**	Sa	6 51	5 39
50	**19**	S	6 49	5 40
51	**20**	M	6 48	5 41
52	**21**	Tu	6 46	5 43
53	**22**	W	6 45	5 44
54	**23**	Th	6 44	5 45
55	**24**	F	6 42	5 46
56	**25**	Sa	6 41	5 48
57	**26**	S	6 39	5 49
58	**27**	M	6 38	5 50
59	**28**	Tu	6 37	5 51

Moon's Phases.

Last Q., Feb. 3, 0 h. 24 m., eve.
New M., Feb. 10, 4 h. 31 m., morn.
First Q., Feb. 17, 3 h. 52 m., morn.
Full M., Feb. 25, 9 h. 15 m., morn.

MARCH, 1899.

3d MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
60	**1**	W	6 35	5 53
61	**2**	Th	6 34	5 53
62	**3**	F	6 32	5 54
63	**4**	Sa	6 30	5 55
64	**5**	S	6 29	5 56
65	**6**	M	6 27	5 57
66	**7**	Tu	6 25	5 58
67	**8**	W	6 24	5 59
68	**9**	Th	6 22	6 00
69	**10**	F	6 21	6 01
70	**11**	Sa	6 19	6 02
71	**12**	S	6 17	6 03
72	**13**	M	6 16	6 04
73	**14**	Tu	6 14	6 05
74	**15**	W	6 12	6 06
75	**16**	Th	6 11	6 08
76	**17**	F	6 09	6 09
77	**18**	Sa	6 07	6 10
78	**19**	S	6 06	6 11
79	**20**	M	6 04	6 12
80	**21**	Tu	6 02	6 13
81	**22**	W	6 01	6 14
82	**23**	Th	5 59	6 15
83	**24**	F	5 58	6 16
84	**25**	Sa	5 56	6 17
85	**26**	S	5 54	6 18
86	**27**	M	5 52	6 19
87	**28**	Tu	5 51	6 20
88	**29**	W	5 49	6 21
89	**30**	Th	5 47	6 22
90	**31**	F	5 45	6 23

Moon's Phases.

Last Q., March 4, 11 h. 6 m., eve.
New M., March 11, 2 h. 53 m., eve.
First Q., March 18, 10 h. 24 m., eve.
Full M., March 27, 1 h. 18 m., morn.

APRIL, 1899.

4th MONTH. 30 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
91	**1**	Sa	5 44	6 24
92	**2**	S	5 42	6 26
93	**3**	M	5 41	6 27
94	**4**	Tu	5 39	6 28
95	**5**	W	5 37	6 29
96	**6**	Th	5 36	6 30
97	**7**	F	5 34	6 31
98	**8**	Sa	5 33	6 32
99	**9**	S	5 31	6 33
100	**10**	M	5 30	6 34
101	**11**	Tu	5 28	6 35
102	**12**	W	5 26	6 36
103	**13**	Th	5 25	6 37
104	**14**	F	5 24	6 38
105	**15**	Sa	5 22	6 39
106	**16**	S	5 20	6 40
107	**17**	M	5 19	6 41
108	**18**	Tu	5 17	6 42
109	**19**	W	5 16	6 43
110	**20**	Th	5 14	6 44
111	**21**	F	5 13	6 45
112	**22**	Sa	5 11	6 46
113	**23**	S	5 10	6 47
114	**24**	M	5 08	6 48
115	**25**	Tu	5 07	6 49
116	**26**	W	5 06	6 50
117	**27**	Th	5 04	6 51
118	**28**	F	5 03	6 52
119	**29**	Sa	5 02	6 53
120	**30**	S	5 00	6 55

Moon's Phases.

Last Q., April 3, 6 h. 55 m., morn.
New M., April 10, 1 h. 21 m., morn.
First Q., April 17, 5 h. 43 m., eve.
Full M., April 25, 2 h. 22 m., eve.

MAY, 1899.

5th MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	Sun sets. H. M.
121	**1**	M	4 59	6 56
122	**2**	Tu	4 58	6 57
123	**3**	W	4 56	6 58
124	**4**	Th	4 55	6 59
125	**5**	F	4 54	7 00
126	**6**	Sa	4 53	7 01
127	**7**	S	4 52	7 02
128	**8**	M	4 51	7 03
129	**9**	Tu	4 49	7 04
130	**10**	W	4 48	7 05
131	**11**	Th	4 47	7 06
132	**12**	F	4 46	7 07
133	**13**	Sa	4 45	7 08
134	**14**	S	4 44	7 09
135	**15**	M	4 43	7 10
136	**16**	Tu	4 42	7 11
137	**17**	W	4 41	7 12
138	**18**	Th	4 40	7 13
139	**19**	F	4 39	7 14
140	**20**	Sa	4 39	7 15
141	**21**	S	4 38	7 16
142	**22**	M	4 37	7 17
143	**23**	Tu	4 36	7 18
144	**24**	W	4 36	7 19
145	**25**	Th	4 35	7 20
146	**26**	F	4 34	7 20
147	**27**	Sa	4 34	7 21
148	**28**	S	4 33	7 22
149	**29**	M	4 32	7 23
150	**30**	Tu	4 32	7 23
151	**31**	W	4 31	7 24

Moon's Phases.

Last Q., May 2, 0 h. 46 m., eve.
New M., May 9, 0 h. 38 m., eve.
First Q., May 17, 0 h. 13 m., eve.
Full M., May 25, 0 h. 49 m., morn.
Last Q., May 31, 5 h. 54 m., eve.

JUNE, 1899.

6th MONTH. 30 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	Sun sets. H. M
152	**1**	Th	4 31	7 24
153	**2**	F	4 30	7 25
154	**3**	Sa	4 30	7 26
155	**4**	S	4 30	7 26
156	**5**	M	4 29	7 27
157	**6**	Tu	4 29	7 28
158	**7**	W	4 29	7 28
159	**8**	Th	4 29	7 29
160	**9**	F	4 28	7 30
161	**10**	Sa	4 28	7 30
162	**11**	S	4 28	7 31
163	**12**	M	4 28	7 31
164	**13**	Tu	4 28	7 32
165	**14**	W	4 28	7 32
166	**15**	Th	4 28	7 32
167	**16**	F	4 28	7 33
168	**17**	Sa	4 28	7 33
169	**18**	S	4 28	7 33
170	**19**	M	4 28	7 34
171	**20**	Tu	4 29	7 34
172	**21**	W	4 29	7 34
173	**22**	Th	4 29	7 34
174	**23**	F	4 29	7 34
175	**24**	Sa	4 29	7 34
176	**25**	S	4 30	7 35
177	**26**	M	4 30	7 35
178	**27**	Tu	4 30	7 35
179	**28**	W	4 31	7 35
180	**29**	Th	4 31	7 35
181	**30**	F	4 32	7 35

Moon's Phases.

New M., June 8, 1 h. 20 m., morn.
First Q., June 16, 4 h. 46 m., morn.
Full M., June 23, 9 h. 20 m., morn.
Last Q., June 29, 11 h. 45 m., eve.

JULY, 1899.

7th MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
182	**1**	Sa	4 32	7 35
183	**2**	S	4 32	7 35
184	**3**	M	4 33	7 34
185	**4**	Tu	4 33	7 34
186	**5**	W	4 34	7 34
187	**6**	Th	4 35	7 34
188	**7**	F	4 35	7 33
189	**8**	Sa	4 36	7 33
190	**9**	S	4 37	7 33
191	**10**	M	4 37	7 32
192	**11**	Tu	4 38	7 32
193	**12**	W	4 39	7 31
194	**13**	Th	4 39	7 31
195	**14**	F	4 40	7 30
196	**15**	Sa	4 41	7 30
197	**16**	S	4 42	7 29
198	**17**	M	4 43	7 29
199	**18**	Tu	4 44	7 28
200	**19**	W	4 44	7 27
201	**20**	Th	4 45	7 26
202	**21**	F	4 46	7 26
203	**22**	Sa	4 47	7 25
204	**23**	S	4 48	7 24
205	**24**	M	4 48	7 23
206	**25**	Tu	4 49	7 23
207	**26**	W	4 50	7 22
208	**27**	Th	4 51	7 21
209	**28**	F	4 52	7 20
210	**29**	Sa	4 53	7 19
211	**30**	S	4 54	7 18
212	**31**	M	4 55	7 17

Moon's Phases.

New M., July 7, 3 h. 31 m., eve.
First Q., July 15, 6 h. 59 m., eve.
Full M., July 22, 4 h. 41 m., eve.
Last Q., July 29, 7 h. 42 m., morn.

AUGUST, 1899.

8th MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
213	**1**	Tu	4 56	7 16
214	**2**	W	4 57	7 14
215	**3**	Th	4 58	7 13
216	**4**	F	4 59	7 12
217	**5**	Sa	5 00	7 11
218	**6**	S	5 01	7 10
219	**7**	M	5 02	7 09
220	**8**	Tu	5 03	7 07
221	**9**	W	5 04	7 06
222	**10**	Th	5 05	7 05
223	**11**	F	5 06	7 04
224	**12**	Sa	5 07	7 02
225	**13**	S	5 08	7 01
226	**14**	M	5 09	7 00
227	**15**	Tu	5 10	6 58
228	**16**	W	5 11	6 57
229	**17**	Th	5 12	6 55
230	**18**	F	5 13	6 54
231	**19**	Sa	5 14	6 53
232	**20**	S	5 15	6 51
233	**21**	M	5 16	6 50
234	**22**	Tu	5 17	6 48
235	**23**	W	5 17	6 47
236	**24**	Th	5 18	6 45
237	**25**	F	5 19	6 44
238	**26**	Sa	5 20	6 42
239	**27**	S	5 21	6 41
240	**28**	M	5 22	6 39
241	**29**	Tu	5 23	6 37
242	**30**	W	5 24	6 36
243	**31**	Th	5 25	6 34

Moon's Phases.

New M., Aug. 6, 6 h. 48 m., morn.
First Q., Aug. 14, 6 h. 54 m., morn.
Full M., Aug. 20, 11 h. 45 m., eve.
Last Q., Aug. 27, 6 h., 57 m., eve.

SEPTEMBER, 1899.

9th MONTH. 30 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	Sun sets. H. M.
244	**1**	F	5 26	6 33
245	**2**	Sa	5 27	6 31
246	**3**	S	5 28	6 29
247	**4**	M	5 29	6 28
248	**5**	Tu	5 30	6 26
249	**6**	W	5 31	6 25
250	**7**	Th	5 32	6 23
251	**8**	F	5 33	6 21
252	**9**	Sa	5 34	6 20
253	**10**	S	5 35	6 18
254	**11**	M	5 36	6 16
255	**12**	Tu	5 37	6 15
256	**13**	W	5 38	6 13
257	**14**	Th	5 39	6 11
258	**15**	F	5 40	6 09
259	**16**	Sa	5 41	6 08
260	**17**	S	5 42	6 06
261	**18**	M	5 43	6 04
262	**19**	Tu	5 44	6 03
263	**20**	W	5 45	6 01
264	**21**	Th	5 46	5 59
265	**22**	F	5 47	5 58
266	**23**	Sa	5 48	5 56
267	**24**	S	5 49	5 55
268	**25**	M	5 50	5 53
269	**26**	Tu	5 51	5 52
270	**27**	W	5 52	5 50
271	**28**	Th	5 53	5 48
272	**29**	F	5 54	5 46
273	**30**	Sa	5 54	5 44

Moon's Phases.

New M., Sept. 4, 10 h. 33 m., eve.
First Q., Sept. 12, 4 h. 49 m., eve.
Full M., Sept. 19, 7 h. 31 m., morn.
Last Q., Sept. 26, 10 h. 2 m., morn.

OCTOBER, 1899.

10th MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	Sun sets. H. M.
274	**1**	S	5 56	5 43
275	**2**	M	5 57	5 41
276	**3**	Tu	5 58	5 39
277	**4**	W	5 59	5 38
278	**5**	Th	6 00	5 36
279	**6**	F	6 01	5 35
280	**7**	Sa	6 02	5 33
281	**8**	S	6 03	5 31
282	**9**	M	6 04	5 30
283	**10**	Tu	6 05	5 28
284	**11**	W	6 07	5 27
285	**12**	Th	6 08	5 25
286	**13**	F	6 09	5 23
287	**14**	Sa	6 10	5 22
288	**15**	S	6 11	5 20
289	**16**	M	6 12	5 19
290	**17**	Tu	6 13	5 17
291	**18**	W	6 14	5 16
292	**19**	Th	6 15	5 14
293	**20**	F	6 16	5 13
294	**21**	Sa	6 18	5 12
295	**22**	S	6 19	5 10
296	**23**	M	6 20	5 09
297	**24**	Tu	6 21	5 07
298	**25**	W	6 22	5 06
299	**26**	Th	6 23	5 04
300	**27**	F	6 24	5 03
301	**28**	Sa	6 26	5 02
302	**29**	S	6 27	5 01
303	**30**	M	6 28	4 59
304	**31**	Tu	6 29	4 58

Moon's Phases.

New M., Oct. 4, 2 h. 14 m., eve.
First Q., Oct. 12, 1 h. 9 m., morn.
Full M., Oct. 18, 5 h. 4 m., eve.
Last Q., Oct. 26, 4 h. 40 m., morn.

NOVEMBER, 1899.

11th MONTH. 30 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
305	**1**	W	6 30	4 57
306	**2**	Th	6 31	4 56
307	**3**	F	6 32	4 54
308	**4**	Sa	6 34	4 53
309	**5**	𝔖	6 35	4 52
310	**6**	M	6 36	4 51
311	**7**	Tu	6 37	4 50
312	**8**	W	6 38	4 49
313	**9**	Th	6 40	4 48
314	**10**	F	6 41	4 47
315	**11**	Sa	6 42	4 46
316	**12**	𝔖	6 43	4 45
317	**13**	M	6 44	4 44
318	**14**	Tu	6 46	4 43
319	**15**	W	6 47	4 42
320	**16**	Th	6 48	4 41
321	**17**	F	6 49	4 40
322	**18**	Sa	6 50	4 39
323	**19**	𝔖	6 51	4 39
324	**20**	M	6 53	4 38
325	**21**	Tu	6 54	4 38
326	**22**	W	6 55	4 37
327	**23**	Th	6 56	4 36
328	**24**	F	6 57	4 36
329	**25**	Sa	6 58	4 35
330	**26**	𝔖	6 59	4 35
331	**27**	M	7 00	4 35
332	**28**	Tu	7 02	4 34
333	**29**	W	7 03	4 34
334	**30**	Th	7 04	4 34

Moon's Phases.

New M., Nov. 3, 5 h. 26 m., morn.
First Q., Nov. 10, 8 h. 35 m., morn.
Full M., Nov. 17, 5 h. 18 m., morn.
Last Q., Nov. 25, 1 h. 34 m., morn.

DECEMBER, 1899.

12th MONTH. 31 DAYS.

Day of Year.	Day of Month.	Day of Week.	N. Y. City. Sun rises. H. M.	N. Y. City. Sun sets. H. M.
335	**1**	F	7 05	4 34
336	**2**	Sa	7 06	4 33
337	**3**	𝔖	7 07	4 33
338	**4**	M	7 08	4 33
339	**5**	Tu	7 09	4 32
340	**6**	W	7 10	4 32
341	**7**	Th	7 11	4 32
342	**8**	F	7 12	4 32
343	**9**	Sa	7 13	4 32
344	**10**	𝔖	7 14	4 32
345	**11**	M	7 15	4 32
346	**12**	Tu	7 15	4 32
347	**13**	W	7 16	4 33
348	**14**	Th	7 16	4 33
349	**15**	F	7 17	4 33
350	**16**	Sa	7 18	4 33
351	**17**	𝔖	7 18	4 33
352	**18**	M	7 19	4 34
353	**19**	Tu	7 20	4 34
354	**20**	W	7 20	4 35
355	**21**	Th	7 21	4 35
356	**22**	F	7 21	4 36
357	**23**	Sa	7 22	4 37
358	**24**	𝔖	7 22	4 37
359	**25**	M	7 23	4 38
360	**26**	Tu	7 23	4 39
361	**27**	W	7 23	4 39
362	**28**	Th	7 23	4 40
363	**29**	F	7 24	4 40
364	**30**	Sa	7 24	4 41
365	**31**	𝔖	7 24	4 42

Moon's Phases.

New M., Dec. 2, 7 h., 47 m., eve.
First Q., Dec. 9, 4 h. 2 m., eve.
Full M., Dec. 15, 8 h., 31 m., eve.
Last Q., Dec. 24, 10 h. 57 m., eve.

REFERENCE CALENDAR FOR THREE YEARS.

1898

	S	M	T	W	T	F	S
Jan.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
Feb.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	..	..	..	..	..
Mar.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	..	..
April	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30

	S	M	T	W	T	F	S
May	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
June	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..
July	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
Aug.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..

	S	M	T	W	T	F	S
Sept.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	..
Oct.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
Nov.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	..	..	..
Dec.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31

1899

	S	M	T	W	T	F	S
Jan.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
Feb.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	..	..	..	..
Mar.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..
April	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	..	..	..	..	..	..

	S	M	T	W	T	F	S
May	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
June	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	..
July	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
Aug.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	..	..

	S	M	T	W	T	F	S
Sept.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
Oct.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
Nov.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..
Dec.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..

1900

	S	M	T	W	T	F	S
Jan.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
Feb.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	..	..	..
Mar.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
April	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	..	..	..	..	..

	S	M	T	W	T	F	S
May	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	..	..
June	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
July	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
Aug.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..

	S	M	T	W	T	F	S
Sept.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	..	..	..	..	..	..
Oct.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
Nov.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	..
Dec.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..

ECLIPSES IN 1899.

NOTE.—*Local mean time for the latitude of New York City is used in reckoning eclipses, sunset and sunrise. Subtract four minutes to change the reckoning to Eastern standard time of 75th meridian.*

Moon's phases are calculated for Eastern standard time. "Morn," is understood to extend from Midnight to Noon: "Eve." from Noon to Midnight.

There will be five Eclipses this year, three of the Sun and two of the Moon, as follows:

I.—A Partial Eclipse of the Sun, Jan. 11, visible on the Northern Pacific coast of the U. S. near sunset.

II.—A Partial Eclipse of the Sun, June 8, invisible in the U. S., except in Alaska.

III.—A Total Eclipse of the Moon, June 23, partially visible on the west coast at the beginning.

IV.—An Annular Eclipse of the Sun, Dec. 2, invisible in the U. S.

V.—A Partial Eclipse of the Moon, Dec. 16. Size, 11.95 digits, or nearly total.

THE SEASONS.

SPRING begins...........March 20, 3 p.m.	AUTUMN begins..... September 23, 2 a.m.
SUMMER begins............June 21, noon.	WINTER begins.......December 21, 9 p.m.

CHURCH DAYS.

Septuagesima Sun...Jan. 29	Good Friday......March 31
Sexagesima Sun....Feb. 5	Easter Sunday .....April 2
Quinquagesima Sun Feb. 12	Low Sunday.......April 9
Shrove Tuesday....Feb. 14	Rogation Sunday...May 7
Ash Wednesday....Feb. 15	Ascension Thursday May 11
Quadragesima Sun. Feb. 19	Whitsunday (Pent.)..May 21
Mid-Lent Sun.....March 12	Trinity Sunday. ... May 28
Passion Sun.......March 19	Corpus Christi . .. June 1
Palm Sunday .....March 26	Advent Sunday.....Dec. 3

CHRONOLOGICAL CYCLES.

Dominical Letter.........	A
Epact..................	18
Lunar Cycle (Gold. No.)	19
Solar Cycle.......... ...	4
Roman Indiction.........	12
Julian Period	6612
Dionysian Period.......	228
Jewish Lunar Cycle......	16

CHRONOLOGICAL ERAS.

The year 1899, which comprises the latter part of the 123d and the first part of the 124th year of the INDEPENDENCE OF THE UNITED STATES OF AMERICA, corresponds to the year 6612 of the JULIAN PERIOD; the year 7407-7408 of the BYZANTINE ERA; the year 5659–69 of the JEWISH ERA; the year 2652 since the FOUNDATION OF ROME, according to Varro; the year 2675 of the OLYMPIADS; the year 1615 of the era of DIOCLETIAN; the year 2559 of the JAPANESE ERA; the year 1316–17 of the MOHAMMEDAN ERA.

The 1st day of January of the year 1898 is the 2,414,656th day since the commencement of the JULIAN PERIOD.

The JULIAN CALENDAR, which is still used in the Russian Empire, dates twelve days back of our own—the GREGORIAN CALENDAR. Thus a letter from St. Petersburg dated January 1st was really written on January 13th.

The Russians generally use, in official documents and frequently in business correspondence, two dates, which they call "old style" and "new style"; and in Alaska three dates have been used on their documents. because the early navigators forgot to make allowance for the crossing of the 180th meridian in sailing from Siberia to North America.

LEGAL HOLIDAYS IN THE VARIOUS STATES.

JAN. 1. NEW YEAR'S DAY: In all States except Massachusetts, New Hampshire and Rhode Island.

JAN. 8. ANNIVERSARY OF THE BATTLE OF NEW ORLEANS: In Louisiana.

JAN. 19. LEE'S BIRTHDAY: In Georgia, North Carolina and Virginia.

FEB. 12. LINCOLN'S BIRTHDAY: In all States.

FEB. 22. WASHINGTON'S BIRTHDAY: In all States except Arkansas, Iowa and Mississippi

FEB. 20 MARDI-GRAS: In Alabama and Louisiana

MARCH 2. ANNIVERSARY OF TEXAN INDEPENDENCE: In Texas.

MARCH 4. FIREMEN'S ANNIVERSARY: In New Orleans, La.

MARCH 31. GOOD FRIDAY: In Alabama. Louisiana, Maryland, Pennsylvania and Tennessee.

APRIL 19. PATRIOTS' DAY: In Massachusetts.

APRIL 21. ANNIVERSARY OF THE BATTLE OF SAN JACINTO: In Texas.

APRIL 26. MEMORIAL DAY: In Alabama and Georgia.

MAY 4. CHARTER DAY: In New York City.

MAY 10. MEMORIAL DAY: In North Carolina.

MAY 20. ANNIVERSARY OF THE SIGNING OF THE MECKLENBURG DECLARATION OF INDEPENDENCE: In North Carolina.

MAY 30 DECORATION DAY: In Arizona. California. Colorado, Connecticut, Delaware, District of Columbia, Iowa, Illinois, Indiana, Kansas, Maine, Maryland, Massachusetts, Michigan. Minnesota, Montana, Nebraska. Nevada, New Hampshire, New Jersey, New York. North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Utah, Vermont, Wisconsin, Washington and Wyoming.

JUNE 3. JEFFERSON DAVIS'S BIRTHDAY: In Florida

JUNE 17. BATTLE OF BUNKER HILL: In Boston, Mass.

JULY 4. INDEPENDENCE DAY: In all States.

JULY 24. PIONEERS' DAY: In Utah.

SEPT. 4. LABOR DAY: In Alabama, California, Colorado, Connecticut, Delaware, Florida, Georgia. Illinois, Indiana, Iowa. Kansas, Maine, Maryland. Massachusetts, Michigan, Montana Nebraska, New Hampshire, New Jersey, New York

Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia and Washington.

SEPT. 9. ADMISSION DAY: In California.

SEPT. 12. LABOR DAY: In Florida.

OCT. 31. ADMISSION DAY: In Nevada.

NOV. 7. GENERAL ELECTION DAY: In Arizona, California, Idaho, Indiana, Kansas, Maryland, Minnesota, Missouri, Montana, Nevada, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, West Virginia, Washington, Wisconsin and Wyoming.

NOV. 25. LABOR DAY: In Louisiana.

NOV. 30. THANKSGIVING DAY; In all States, though in some it is not a statutory holiday.

DEC. 25. CHRISTMAS DAY. In all States; in South Carolina, the two succeeding days in addition.

SUNDAYS AND FAST DAYS are legal holidays in all States, which designate them as such.

ARBOR DAY is a legal holiday in Kansas, North Dakota, Rhode Island and Wyoming, the day being set by the Governor—in Nebraska, April 22; California, September 9; Colorado, third Friday in April; Montana, third Tuesday in April; Utah, first Saturday in April: Idaho, Friday after May 1.

EVERY SATURDAY after 12 o'clock noon is a legal holiday in New York, New Jersey, New Orleans, Pennsylvania and Maryland; and from June 1 to September 30 in New Castle Co., Del.

THERE are no national holidays, not even the Fourth of July. Congress has at various times appointed special holidays. In the second session of the Fifty-third Congress, it passed an act making Labor Day a public holiday in the District of Columbia; and it has recognized the existence of certain days as holidays, for commercial purposes, in such legislation as the Bankruptcy act, but with the exception named, there is no general statute on the subject. The proclamation of the President designating a day of thanksgiving only, makes it a holiday in those States which provide by law for it.

UNITED STATES AND TERRITORIES.

States and Territories.	Estimated Populat'n.	Capitals.	States and Territories.	Estimated Populat'n.	Capitals.
Alabama	1,600,000	Montgomery.	Montana	185,000	Helena.
Alaska Terr	31,000	Sitka.	Nebraska	1,158,000	Lincoln.
Arizona Terr	77,000	Phœnix.	Nevada	60,000	Carson City.
Arkansas	1,600,000	Little Rock.	New Hampshire.	400,000	Concord.
California	1,220,000	Sacramento.	New Jersey	1,672,942	Trenton.
Colorado	450,000	Denver.	New Mexico T.	185,000	Santa Fé.
Connecticut	800,000	Hartford.	New York	6,690,842	Albany.
Delaware	179,700	Dover.	North Carolina.	1,720,000	Raleigh.
Dist. Columbia	270,519	Washington.	North Dakota	225,000	Bismark.
Florida	485,000	Tallahassee.	Ohio	4,000,000	Columbus.
Georgia	1,984,939	Atlanta.	Oklahoma Terr.	275,000	Guthrie.
Idaho	130,000	Boise City.	Oregon	400,000	Salem
Illinois	4,500,000	Springfield.	Pennsylvania	5,760,128	Harrisburg.
Indiana	3,135,360	Indianapolis.	Rhode Island	384,758	Providence.
Iowa	2,000,000	Des Moines	South Carolina.	1,375,000	Columbia.
Kansas	1,350,000	Topeka.	South Dakota	332,000	Pierre.
Kentucky	2,200,000	Frankfort.	Tennessee	1,800,000	Nashville.
Louisiana	1,225,000	Baton Rouge.	Texas	2,838,263	Austin.
Maine	732,000	Augusta.	Utah Terr	254,743	Salt Lake City.
Maryland	1,138,348	Annapolis.	Vermont	340,000	Montpelier.
Massachusetts	2,495,345	Boston.	Virginia	1,750,000	Richmond.
Michigan	2,297,000	Lansing.	Washington	415,000	Olympia.
Minnesota	1,610,000	St. Paul.	West Virginia	875,000	Charleston.
Mississippi	1,351,850	Jackson.	Wisconsin	1,937,915	Madison.
Missouri	3,200,000	Jefferson City.	Wyoming	100,000	Cheyenne.

Grand Total, January, 1896. 71,197,652

DIFFERENCE IN TIME (FOR CABLE PURPOSES),

BETWEEN THE CITY OF NEW YORK AND THE PRINCIPAL FOREIGN CITIES.

LATER THAN NEW YORK.	H. M.		H.M.		H M.	EARLIER THAN NEW YORK.	H.M.
Antwerp	5 13.5	Dublin	4 30.5	Rio de Janeiro.	2 3.2	Havana	0 33.5
Berlin	5 49.5	Edinburgh	4 43.2	Rome	5 45.8	Hong Kong	11 27.4
Bremen	5 31.0	Geneva	5 20.5	St. Petersburg	6 57.1	Melbourne	9 24.2
Brussels	5 13.4	Hamburg	5 35.8	Valparaiso	0 9.3	Mexico City of	1 40.5
Buenos Ayres	1 2.4	Liverpool	4 43.6	Vienna	6 1.2	Panama	0 22.2
Calcutta	11 49.2	London	4 55.9	Halifax	0 41.5	Yokohama	9 45.5
Constantinople	6 51.9	Madrid	4 41.1				
		Paris	5 5.2				

Photo-Gelatine Print by The Albertype Co., Brooklyn, N. Y.

CHILD STUDY

By HAROLD BAKER.

The American Annual of Photography
AND
Photographic Times Almanac, 1899

Edited by Walter E. Woodbury.

PORTRAITURE AND THE CAMERA.

BY F. H. DAY.


By GERTRUDE KASEBIER.

AMONG the various branches of the art of the camera, portraiture holds the place of the most difficult and is least often truly successful. That this should be so in these days when reproductions of the works of the great masters are so readily obtainable, appears quite inexplicable, unless we are to assume that he who produces likenesses by means of the lens and a dry plate has no desire to produce anything else. A likeness and a portrait are far from being one and the same, and although even the former is capable of being caricatured, the latter is far more apt to suffer at the hands of the man behind the camera. The one is as difficult to avoid as the other is to produce, under the same circumstances of subject and light and lens. What,

PORTRAIT OF MRS. F.

then, is the difference? Purely a matter of knowledge, or the lack of it, on the part of the operator. If one expects to produce art they must have at least a rudimentary acquaintance with examples and the history of art as a background upon which to draw in or model the subject chosen. If the most casual observer has had a sitting with Mrs. Cameron or Hollyer, he will surely recollect that the studio was not completely flooded with light as, I may venture to say nine hundred and ninety-nine out of every thousand photographers will consider an absolute necessity. If we have our portrait made by Hollinger or Mrs. Kasebier, we find no prepared canvas backgrounds, no painted gates, or fences, or flower pots, no vises into which our heads and shoulders are mercilessly set; which are as certainly a part of the usual photographer's apparatus as the camera itself. It is not the possession of paraphernalia which makes the portrait artist; although that is all his brother, the likeness manufacturer, can assume. One's knowledge of the diffusion of lights, of the actinic qualities of colors, of length of exposures under differing conditions, of under or over developing for given results, of under or over printing for the same effect, may be learned only by constant and repeated failures, by continual observation, and unceasing application. These, being largely mechanical, are easy, but that which is of equal importance in the production of portraiture, that which is the rarest of

THE GAINSBORO' HAT.

BY F. H. DAY.

PORTRAIT OF LEWNG MOON TOON. By F. H. DAY.

all qualities of the operator and which we will term a sense of composition would appear, from the very extent of its scarcity, to be acquired only with the most arduous difficulty. This sense of composition covers more than mere lines and curves. It includes spots and masses. It means light and shade in all their vagueries as well as brilliancy. It means the proper introduction of the necessary accessory, and after the print is made the proper cutting to render the fullest possible value.

This last quality of the feeling for composition is indeed so uncompromisingly necessary that a special article would be needed to treat it in the most elementary way. With the exception of this sense of composition all necessary qualities may be obtained, or trained into one, in almost as many manners as there are students, all of which teach through experience and failure; but this sense cannot be acquired save only in one way, *i. e.*, studying and observing the work by masters of the brush or burin.

Some will say they have studied composition in an art institution! Very well, go and unlearn your learning as fast as you can, for you will find every rule you have been taught to abide by, is ruthlessly disregarded by one or another of the truly great. A Massachusetts man, through dint of great labor, has discovered a mathematical basis and course of

PEGGY.

BY F. H. DAY.

PORTRAIT OF MRS. H. By F. H. DAY.

reasoning through following which one can do Japanese art as correctly as Toyokuni ever did. Poor man! It is like casting iron grills! No, let me repeat, the only road to the acquisition of a knowledge of composition is that which surrounds us on every side with examples of the greatest artists, together with a thorough appreciation and assimilation of the reasons which make their work great above the work of others. An artistic eye will perhaps realize that Franz Hals is a greater than Bouguereau, and sufficiently well that its possessor may reproduce almost literally the work of others, given the required properties; but the real test of the student's skill will not be in the cleverness with which he reproduces the compositions of Franz Hals or Bouguereau, but in the capacity he evinces of analyzing the causes of difference between the masters, and adapting his analysis in such a manner as befits his own requirements to an extent which will recall the chosen artist's work to the mind of an observer. When this point of self-education is reached the camera man will be able to force exigencies and produce art. Let his range of masters be as large as possible, and his knowledge of their work embrace as many examples as possible. To confine oneself to one man or one school is surely better than no school and no man; but the wider and larger the training the finer and mellower the results.

We are told of the length of art and the shortness of life, therefore discouragement should be admitted only after prolonged procrastination in those who have any regard for Beauty or the Beautiful.

PORTRAIT STUDY. By F. H. DAY.

STUDY.

BY HOWARD GRAY DOUGLAS.

PASSAIC FALLS, PATERSON, N. J. By VERNON ROYLE.

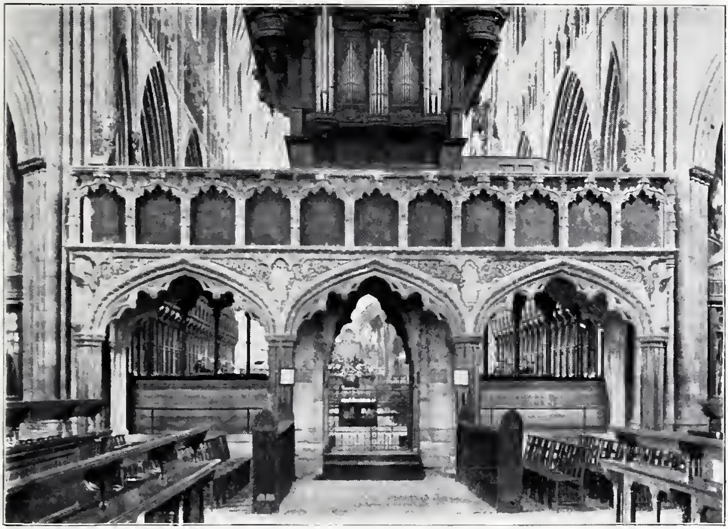
EXETER.

BY T. PERKINS, M. A., F. R. A. S.

HOMELESS, RAGGED AND TORN.
By SEYMOUR CONWAY.

FEW I believe of those who cross the Atlantic to visit the old country travel so far west as the fair land of Devon. Devon with its red cliffs overlooking the channel, its rich green pastures in which stately long-horned red-coated cattle feed, its orchards, white in the spring time with blossom, red in autumn tide with apples, its plump, rosy-cheeked soft-complexioned damsels, "Devonshire dumplings," named by the dwellers in other counties, and also by the same authorities slanderously asserted to be "web-footed" to fit them for walking in the mud and along the "water-lanes" so common in this West country, where the wind that has gathered moisture in its passage over the Atlantic constantly discharges it in the form of rain. Yet those who do take the Great Western Cornishman or Dutchman or Zulu, as the expresses on this line to the West are called, will find themselves well repaid by the lovely scenery that, if they are not photographers, they can admire and enjoy, but if they are devoted to our art, may enrich their store of negatives withal. But it is not of Devon as a whole that I wish to write, but of its capital, Exeter, and especially of the Cathedral Church of St. Peter, which stands unique among the great churches of the land, as Exeter itself stands among its cities. Unique the city certainly is. It was founded we know not when, in prehistoric times, was the abode of the Keltic Britons, then fell along with all the Southern part of Britain into the iron hand of Rome, and when that was withdrawn became once more the abode of Kelts now Christianized, and then unlike other cities did not fall a prey to the conquering English until they themselves had been converted to Christianity by missionaries from Rome. Hence never at Exeter, as elsewhere, was the worship of Christ when once established displaced by the worship of Woden and Thunder, but conquered Welsh and conquering English, living, it would appear, after the taking of the city by the latter, in different quarters of the town, alike worshipped Mary's Son.

I can not dwell at any length upon the history of the city, I can but tell how the first authentic record speaks of the Danes holding it for a short time in 876, and of their expulsion by Alfred the Great; how we find just fifty years later Æthelstan the Glorious on his way to fight the Britons of the further West, removing the British inhabitants from Exeter, strengthening the walls, and holding a Gemot of the whole kingdom within them; how in 1001 the valiant men of Exeter beat off the Danes under Pallig, brother-in-law of the great Swegan, who had sailed up the river Exe and assaulted the city; how two years later Swegan, through the cowardice or treachery of the Norman defender Hugh reeve of Norman Emma the King's Lady, on whom the city had been bestowed as her "morning-gift," captured



ROOD SCREEN, ST. PETER'S CATHEDRAL, EXETER. By T. PERKINS.

and plundered the city, but did not alter the English into a Danish stronghold; how for a time Exeter with the rest of England was under Danish rule in the days of Knut; how in the peaceful years of the Confessor the Bishop's stool was removed from Crediton to Exeter, and Leofric was duly enthroned, the King and his Lady, English Edith, daughter of Godwine, sister of Harold, holder like Emma of Exeter as her "morning-gift," taking part in the ceremony; how in the days of the Norman conquest the city withstood William bravely, but at last yielded when he undermined the walls; how the Norman Castle was built on the Red Mount to overawe the citizens; how their spirit was so crushed that the men of Exeter gave no help to the men of Devon and Cornwall when they rose in revolt against the conqueror in 1069.

I must now turn to the Cathedral Church. Of the early Church which existed before Leofric placed his Bishop's stool at Exeter, and which served as the Cathedral Church till the early part of the twelfth century, nothing remains. It is noteworthy that the building of a new Church was delayed so long, not only Leofric but his Norman successor Osbern was satisfied with the old building. It was during the Episcopate of William of Warelwast (1107 to 1136) that the Norman Cathedral Church dedicated to St. Peter was built, of this the two towers remain, and some of the existing walls are thought to be of the same date. In no other Church in England, save in the Devonshire Church of Ottery, built in imitation of St. Peter's Exeter, does such an arrangement of towers exist, how the original Church stood in respect to them we do not know, but now they stand not at the West end, as at Westminster, Lincoln, Wells, and elsewhere, but on the North and South sides of the main building, which is let in between them with an unbroken ridge of roof without, and an unbroken line of vaulting within, from East to West, and form, as it were, transepts which seen from within do not differ in any way from those in any other Church. The Norman Church begun by William of Warelwast was carried on and completed by his successors during the twelfth century. Towards the end of the thirteenth century Bishop Peter Quivil began to transform it; large windows in the beautiful Decorated style then prevailing were inserted in the towers, afterwards the Lady Chapel was built at some distance to the East end of the choir to permit of the extension of the choir eastward, next under William Bitton (1292-1397), and Walter Stapleton (1308-1326), the choir was begun and finished, under John Grandison (1327-1369), the nave was taken in hand, and partially or entirely rebuilt, certainly lengthened westward. He also finished the noble throne, the stateliest in England, rising well nigh to the vaulted roof. In 1369 the whole building was finished and dedicated. From this it will be seen that the rebuilding was begun at a time when English architecture was at its zenith, and although it was not finished before the inferior style of the perpendicular had established itself in other parts of England, yet this change had but little influence on the work at Exeter. Thus, as, if we were asked for the most perfect type of early English work we should at once name Salisbury, so we should name Exeter if asked for the best specimen of Decorated work. No where else do we find such splendid specimens of window tracery as here. Each window on the one side is matched by one exactly similar to it on the other, but no two windows on the same side are alike. This is illustrated by the accompanying process block, which gives the Western part of the north side of the nave and aisle. From within we notice that the clerestory windows are of great size, and that the triforium is reduced to a low arcading. The height of the roof is not great, had it been the towers would have been dwarfed, and these could not have been added to without spoiling their proportions. The West front is the least satisfactory portion of the exterior. Within we could hardly wish any change made, save the removal of some unsightly modern monuments. All is well nigh perfect, the glorious windows, the stately pillars, the beautiful vaulting, the long vista, and we may add the lively strains of the organ which has not been displaced at Exeter as in many other churches from the position best for sound. Among other objects that the photographer should not overlook are the unique minstrel's gallery in the north triforium of the nave, the clock in the North transept, and the window above it on which it is said Sir Gilbert Scott the architect used to gaze with admiration for hours together, the Sedilia on the South of the high altar, the Bishop's throne, the chapels at the East end of the choir aisles, and several interesting monuments, and last but not least the thirteenth century rood screen with its fifteenth century painted panels which forms the subject of the second illustration.

NORTH SIDE OF NAVE
ST. PETER'S CATHEDRAL, EXETER.
By T. PERKINS.

Besides the Cathedral Church the old guild hall will interest the photographer, and on the level meadows bordering the Exe as it runs down to the sea good landscape subjects will be found. From what has been said above it will be seen that the photographer from the Western side of the Atlantic who visits this island should not leave its shores without devoting a day at least to the capital of the West of England.

THE DIVER. By LOUIS MELDON.

LANDSCAPE.

BY L. V. KUPPER.

SUNSHINE AND SMOKE. By EDGAR G. LEE.

ON THE LODDEN. By SEYMOUR CONWAY.

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By G. C. THOMAS.

"FAIRY TALES."

PLATINOTYPE PRINTING.—BROWN TONES.

BY REV. JOSEPH BEANLAND, M. A.

THE DROPPING WELL, KNARESBORO.
By J. BEANLAND.

THERE are many photographers who seem to avoid the above fascinating printing process on account of the cold gray and black tones which are always associated with it. If such workers instead of attempting to get warm tones on other printing papers which have the reputation of being easier to work, would only carefully work this permanent and simple process, they would soon learn that warm tones may be obtained without the slightest difficulty by simply modifying the developer according to the required result.

In this article we shall endeavor to show how these warm tones may be obtained without resorting to the various intensifying and toning chemicals. There is one kind of platinotype paper which we may pass over with only a very brief notice—the printing out platinotype paper. There are two or three various makes of this sort on the market, but as far as our experience goes we may say that no brand is reliable if identically the same tones are always required, as sometimes the resultant tone is warm black, whilst at others it is cold black.

I. Sodium Carbonate Developer.—If the hot bath paper has been kept for a considerable time and has deteriorated, which is at once apparent on development in the ordinary potassium oxalate developer by the unpleasant gray tone and muddiness of the image. The paper may often be used and pleasing results obtained in the following manner: Print rather more deeply than is required with fresh paper. (This deeper printing is always advisable when using old or damp paper), and instead of using a potassium oxalate developer make up the following:

Sodium carbonate..................................	1 ounce
Water..	10 ounces

This developer is most successful when heated to a temperature of 160° F.

II. Mercury Developer.—Most platinotype workers know two facts: (1.) A negative which has been intensified with mercury, although it may be to all outward appearance exactly the same as a negative which was developed to the required density will never (unless varnished) yield a platinotype print of a cold black tone. (When a negative is required for platinotype printing, it is advisable to remember this fact, if intensification would improve it.)

(2.) That a brush which has once been used for developing cold bath platinotype prints with a solution containing mercury, can never be satisfactorily used for developing when cold black tones are required.

From these two facts we may draw an inference, which in actual experience will be found correct. That the addition of mercury in even the slightest proportion tends to produce warm tones.

The developer which yields the tone which is very often desired at the present is:

Normal oxalate developer..................	1 ounce
Mercuric chloride sat. sol..................	1½ drams

In the development of the cold bath paper by means of a brush, one dram of the mercuric chloride is quite sufficient to each ounce of the developer.

The developer which we have found most satisfactory is the following:

Normal oxalate solution....................	4 drams
Glycerine..	4 drams
Mercuric chloride sat. sol....................	1 dram

III. Potassium Bromide Developer.—Another way to obtain warm tones is by the addition of a chemical which every amateur has in his chemical cupboard—potassium bromide. When printing on the cold bath paper a very rich brown tone may be obtained by using the following developer.

Normal oxalate solution	1 ounce
Potassium bromide 10% sol.	1 dram

This developer gives the most pleasing results when heated to 100° F. We need hardly say that the prints must be slightly under printed, to compensate for the extra density obtained by heating the developer.

IV. Alkali Developer.—It is a well known fact that the potassium oxalate developer which has an acid reaction will yield cold tones, and we need do no more than merely mention that a developer which has an alkaline reaction will conversely yield warm tones. The best alkalies to add to the developer are the carbonates of sodium or potassium. Ammonia is most unsuitable for this purpose.

V. Deteriorated Oxalate Developer.—There is still another way to obtain warm tones which I have never seen mentioned, as far as I know, in any work or article on platinotype printing, and that is by the use of a deteriorated weak solution. We all know that it is advisable to keep the oxalate developer in the strong solution, and to dilute it to a 10 per cent. solution as we require it for use. If the strong solution be diluted and then allowed to stand for a few months (protected from dust) in a bottle without cork; if the print (cold bath paper) be printed slightly deeper than usual, and this solution used at normal temperature instead of a freshly made developer, a very pleasing warm brownish gray tone will be obtained. We always use this developer for prints of detail work in architectural photography.

VI. Heating the Developer.—We now come to the last method. It is well known amongst platinotype workers that the tones of the hot and cold bath platinotype papers may be modified by altering the temperatures of the developer. The rule may be stated as follows: The colder the developer, the colder the image; the warmer the developer the browner the image. We need therefore only state the limits.

It is not advisable with the cold bath paper to have the temperature more than a few degrees below 60° F. or above 130° F. With the hot bath paper the limits may be said to be 80° F. and 200° F. The best way therefore is to print a few proofs from the same negative to suitable depths, and after development in developers of various temperatures to carefully note particulars for future reference.

The normal oxalate solution alluded to above is as follows:

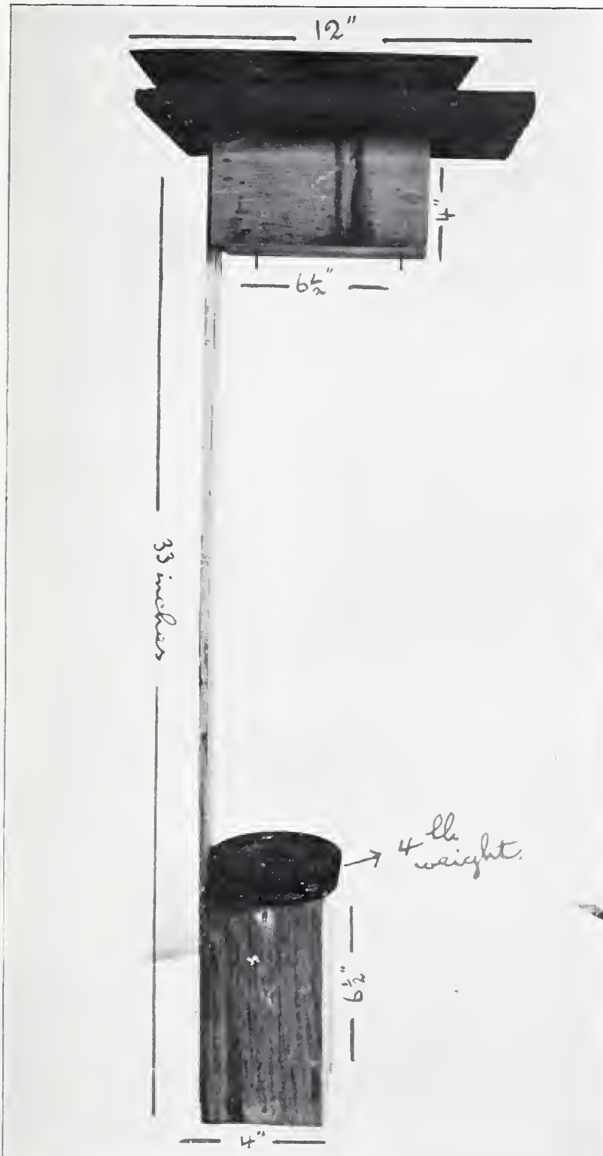
Potassium oxalate	16 ounces
Boiling water	54 ounces

A DARK-ROOM NECESSITY—A ROCKING-TABLE.

BY WALTER BURKE, F. R. P. S.

By WALTER BURKE.

ROCKING-table is a useful piece of apparatus seldom seen in the every day dark-room, and yet, when once used, it becomes an absolute necessity. I have had one in use for several years past, and the advantages are so obvious that everyone who has seen or used it wants to possess one right away. With it you can keep two or three plates going in different dishes or in one big one with an occasional touch, the developer flowing gently the whole time. I knocked mine together in a few minutes, and perhaps my experience may be of value to others. It consists of two pieces of heavy wood, 5 x 4 inches, 6½ inches long, a slat of strong wood 33 inches long, 2 inches wide and ½ inch thick; and two pieces of board 12 inches long, 6 inches broad, and ½ inch thick for the top. The manner of putting it together is clearly shown in the illustration, and it rocks on two nails. If the piece of wood at the bottom is not heavy enough to keep the table in motion when started, a weight can be put on the flat top of the wood as shown. I have used a spare four-pound weight which answers capitally.



A CONVENIENT ROCKING TABLE.

MID-AIR KITE PHOTOGRAPHY.

BY WILLIAM A. EDDY.

ONE of the difficulties constantly encountered by photographers is the inability to get a complete view of a very large building or of parks or grounds. Expensive structures have been built in and near New York to support in mid-air the cameras to be used by view photographers in taking photographs of buildings closely hemmed in by narrow city streets. My experience in taking about four hundred mid-air kite photographs convinces me that with certain houses and grounds the view from aloft is far more effective than one taken near the ground. It is of course better to take very large pictures by means of the supporting power of three or four kites fifteen feet in diameter, since in this way the vast background of the photograph, rising to the upper part of the picture will be far more impressive because more definite kite photographs are particularly subject to defects, such as slight fogs and light streaks, hence, enlargements are rarely successful as compared with the original. The kite photographs are subject to a far greater number of accidents than those taken at the earth—such as premature shutter movements, swift plunges at the moment of exposure, and forced exposures caused by declining wind. So high was the average of accidents during my experiments beginning with my first successful photograph in the Western Hemisphere on May 30, 1895, that of the first dozen

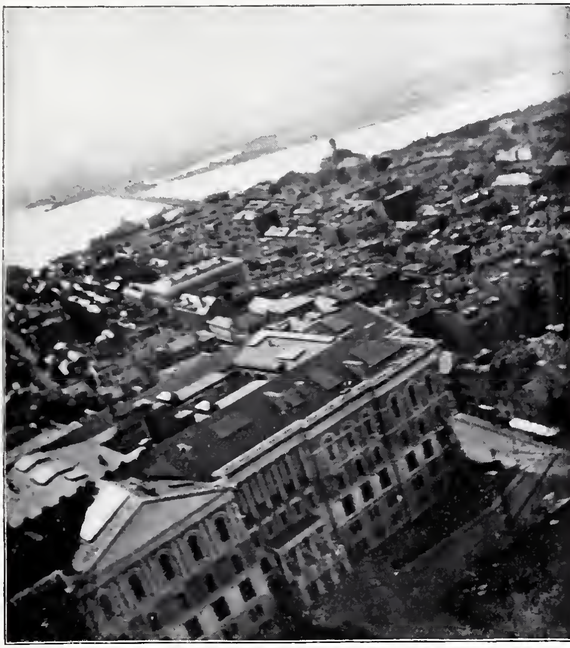


FIG. 1.

exposed only four were worth preserving, and these were defective in that the shutter was discharged prematurely at a height of from six to thirty feet above the ground. But later, in July, 1895, I succeeded in getting a kite photograph with the camera at the height of about 800 feet, and on August 3, 1895, I obtained my first clear, high level picture at an altitude of about 400 feet, at Bayonne, N. J. I shall never forget my delight when I saw the rectangular lines of a street with some scattered one story houses appear on the film as I developed it. I found that the roads and paths across vacant lots

FIG. 2.

were light gray or white when I came to print the photograph. The contrast of black and white is positive in the roads and on the stone pavements, and black or dark on grass, trees, and vegetation in suburban neighborhoods.

FIG. 3.

The perils attending mid-air photography are many, as related to the safety of the camera. Owing to the relatively great strain upon the cord there is always great danger of a break-away. I have had my camera fall long distances owing to breaks in the line on three occasions—one in Boston, one in New York, at the time of the Sound Money Parade, and one at Bayonne. In all these cases the camera was recovered unharmed, and without breakage of plates, because films were used. At Washington, D. C. an injudiciously rapid hauling in of the main cable by a volunteer assistant caused a break-away, the camera descending so far, owing to the declining of the receding kites, that it narrowly escaped striking the Senate wing of the

FIG. 4.

FIG 5.

Capitol. In all these cases of accident the special frame surrounding the camera was either partly or wholly destroyed, but always leaving the camera and lens intact.

In regard to the use of telescopic lenses in mid-air, I have consulted with some of the experts of the New York Camera Club, and they admit that within certain limits of magnification I can discern objects at great distances, and I am certain from my results thus far achieved that I can make out the outlines of ships so far away that they would not be visible from the deck of the steam launch from which the aerial cameras might be sent out. My apparatus for taking six photographs by means of six cameras placed back to back on a whirling table is patented, and the method has been submitted in detail to the U. S. Navy for war use in discerning distant vessels at sea. The six or eight photographs in a circle are taken simultaneously.

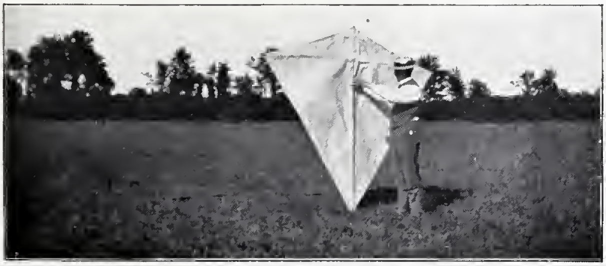


FIG. 6.

Figure 1 shows the rear part of roof of Boston State House, Boston, Mass.,—in the baekground is Charles River.

Figure 2 shows Court House, Boston, Mass., with a glimpse of Cambridge in the baekground.

Figure 3 shows roof of City Hall in New York City with figures in City Hall Park.

Figure 4 shows Edison Illuminating Building, part of Centre and Pearl Streets, New York City.

Figure 5 shows junetion of Chambers and Chatham streets, with line of the Elevated railroad in New York City.

Figure 6 shows front of the Eddy tailless kite, showing side of the kite which faces the wind when flying The kite is being held in position by the author himself. The kite is seven feet in diameter, and from four to six of these are required to raise a eamera for kite photography.

FINDING VIEWS TO PHOTOGRAPH.

BY DAVID GRAY ARCHIBALD.

PORCH, FOWEY, CORNWALL.
By LLEWELYN MORGAN.

THE finding of views to photograph depends upon being able to see them. They are all around us We must be able to perceive a picture, to judge of the best possible position to take it from, and to know how to take it—I mean how to give it expression. To photograph successfully two things are necessary; a knowledge of what you want, and skill in photography to be able to take it as you want it.

View-getting is more a matter of selection than anything else. We often see pictures of familiar places, which we have regarded as unpicturesque, and are astonished to see the beauty another has found. At such times we ask ourselves "Why did I not see beauty in that before? Has my vision been dulled with being with it too much?"

THE READERS.

BY CLARENCE WHITE

We should think well about the picture possibilities of our neighborhood before condemning it as uninteresting. We should be able to tell why this or that view pleases. The analysis of what we like in a picture will often set us to work in a new direction, open up new fields of delight, and show nature in new aspects to our senses. We are too apt to wish to record facts, especially things which possess more of the merit of novelty than of beauty. Our first delight is in having things look real. Later a few photographers seek to feel and capture the charm of subject, passing then on to the realm of the ideal.

There is much pleasure to be found in atmospheric effects; in bits of light and shade; in morning mists, and in sunsets which may render commonplace scenes surprisingly beautiful. Our constant aim should be to discover their beauties, not alone while with camera in hand, but at all times, so that we may be able to tell just where to go when we have time to spare, and at what time to go to get the exact things desired. Like the painter we must be ever alive to our chosen work, ever watchful for material, ever in the spirit of seeing light and shade and pictorial masses.

We are apt to expect too much; to want to have everything perfect (according to our idea of perfection) so to magnify a little defect that we lose the whole in rejecting the part. Many spots have pictorial value, but are not complete "compositions." When upon the plate faulty things often sink into insignificance.

In judging aim to have reasons. Know why you like or do not like a thing.

So let us look our field over again and see if we cannot find many spots that will make interesting pictures and help us pass a few hours in the search of the beautiful.

SNOW STORMS.

BY MAXIMILIAN TOCH.

By P. BERGON.

TO PHOTOGRAPH the snow falling is by no means easy, unless certain conditions are obtained, and even then, it is to be remembered that carelessness in development will obliterate the flakes.

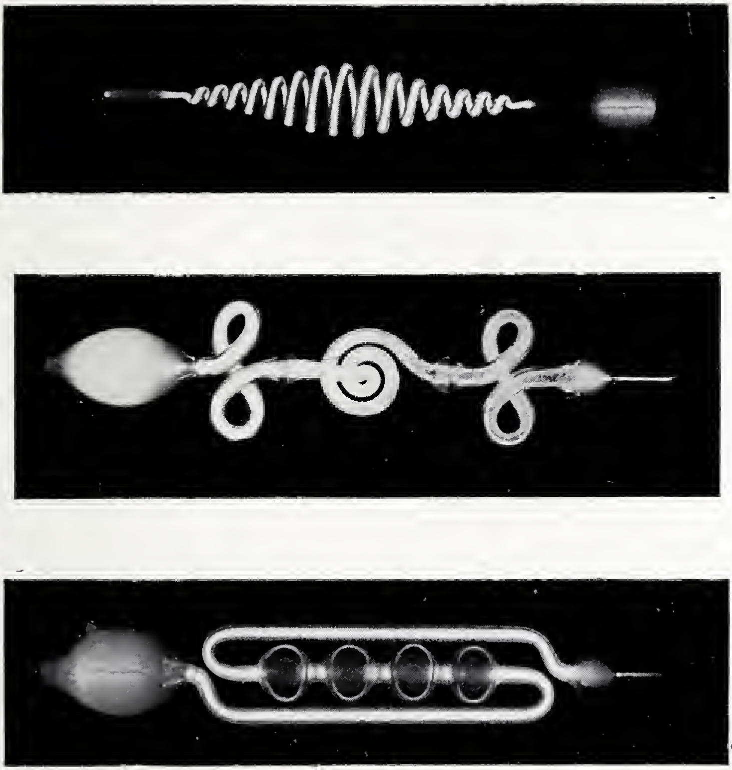
To begin with, it is impossible to photograph the snow flakes against a sky background, because white against white neutralize each other optically, or in other words the refractive indexes of both are so nearly alike that white is the result without any detail. Bearing this in mind I selected a spot where the background was a row of brick houses, and against which the white flakes stood out. The children were all moving naturally, and it was no place where I could waste much time, as my camera was getting wet, and I had to shield my lens from the wet flakes. The picture was taken in one-fiftieth of a second, and it came up

SNOW STORM. By M. TOCH.

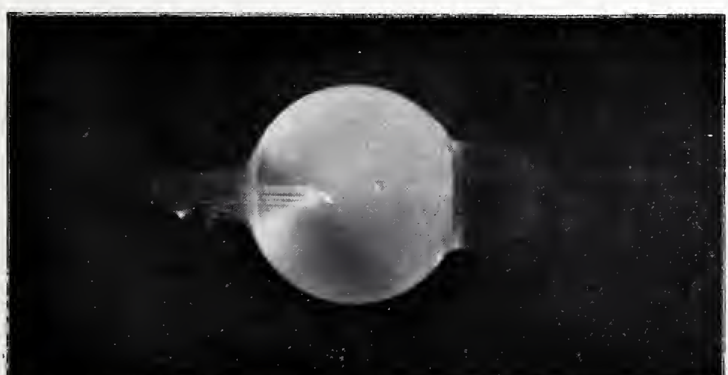
in the developer as soft and easy as if it had had a second or two. I took five more the same day, but with the exception of one other they were monstrosities. There was one, of a man struggling against the storm, with a big umbrella, and the flakes were coming down furiously, but, alas! when I developed it his black figure was streaked and spotted with monstrous flakes which were falling between him and the camera, and they were so horribly amplified, that I discarded the negative after the first print. I could have corrected the negative by retouching or by the oldtime "fake" of spattering water color with a toothbrush, but had I done that, this article would never have been written.

I advise every camerist to try snowstorm pictures next winter, but be sure and photograph the scene against a dark background, and get under a shed or an awning, if possible so that no flakes will fall near the lens and spoil the effect of the picture.

UNIVERSITY CHURCH, CAMBRIDGE. By THE REV. J. BEANLAND.



VACUUM TUBES PHOTOGRAPHED BY THEIR OWN LIGHT. By JAS LEADBEATER



X-RAY TUBE PHOTOGRAPHED BY ITS OWN LIGHT BY JAS. LEADBEATER.

TABLE OF PERMEABILITY OF ROENTGEN RAYS.

TRANSLATED BY A. B. AUBERT.

By P. BERGON.

MESSRS. BOTTELLI and GARBASSO have made a series of experiments upon the permeability of the Roentgen rays through a number of substances which are given in tabulated form below (From *Bolletino della Societa Photografica Italiana*):

PERMEABILITY OF WATER=1.

Tin	0.118
Zinc	0.116
Iron	0.101
Deal	2.21
Walnut	1.50
Paraffin	1.12
Rubber (pure gum)	1.10
Wax	1.10
Stearine	0.94
Pasteboard	0.80
Ebonite	0.80
Horn	0.80
Woolen tissue	0.76
Celluloid	0.76
Whalebone	0.74
Silk	0.74
Cotton	0.70
Charcoal (hard wood)	0.63
Starch	0.63
Sugar	0.60
Bone	0.56
Magnesium	0.50
Coke	0.48
Glue	0.48
Sulphur	0.47
Lead plaster	0.40
Aluminum	0.38
Talc (soapstone)	0.35
Glass	0.34
Chalk	0.33
Antimony	0.126
Nickel	0.095
Brass	0.093
Cadmium	0.090
Copper	0.084
Bismuth	0.075
Silver	0.070
Lead	0.055
Palladium	0.053
Mercury	0.044
Gold	0.030
Platinum	0.020
Ether	1.37
Petroleum	1.28
Alcohol	1.22
Amyl alcohol	1.20
Olive oil	1.12
Benzole	1.00
Water	1.00
Muriatic acid	0.86
Glycerine	0.76
Carbon disulphide	0.74
Nitric acid	0.70
Chloroform	0.60
Sulphuric acid	0.50

By CHAS. I. BERG.

"COQUETTE."

ADVANTAGES OF CAMERA CLUB MEMBERSHIP.

BY WILLIAM D. MURPHY.

By C. L. BAER.

ALTHOUGH much has been written upon the subject. Photographic Clubs and Societies as influencing the study and advancement of the art to which they are dedicated, there may perhaps be room for a few additional words bearing more especially upon the direct personal benefits accruing from membership in such organizations.

Photography is essentially conducive to sociability, and it may be said with due regard to truth, that amateur photographers are among the most sociable people on earth, consequently constituting a class particularly available for Club membership, and it is astonishing to note how small a percentage of the ever increasing brotherhood of the camera is to be found in the organizations devoted to their interest. This can only be explained on the hypothesis that the real advantages to be derived from our fraternal societies have not been fully appreciated by the uncounted thousands who press the button and leave the rest to fate.

It is safe to assume that few beginners ever enter the photographic field without a hope of ultimately comprehending something of the higher phases of the art, or even if it is only taken up as a passing fad, the undeniable fascinations of the work will sooner or later awaken a commendable ambition to know more of its inner mysteries.

Let such a beginner meet with fair success, working as an independent and unattached recruit in the great army of the camera, and it will not be long before he reaches a point where further advancement seems well nigh impossible to him, for without the opportunities of association with others more proficient in the art, he will fall uncorrected into habits that only serve to confirm him in his faults, and render his pictures an unchanging series of conventional and stereotyped views. Whereas, if in the days of his noviciate he is fortunate enough to join a Camera Club he will not only find associates ready and able to save him from many of the poignant pangs of early failure, but will continually draw inspiration and encouragement from the successes of experts daily achieved and exhibited in his immediate environment.

In a strictly business sense, it goes without saying that the advantages of well appointed workrooms and studios, including facilities for copying, enlarging, reducing and prosecuting the higher branches of photographic work, more than compensate for the trifling cost of membership in such organizations, without reckoning the overwhelming benefits to be derived from the associations above outlined.

But all this only bears upon the personal side of the matter as affecting individual members, while the true and lasting motives for maintaining our photographic clubs should be found in a desire to advance the interests of the art, encourage experimentation, and raise the standard of photography to higher artistic and scientific planes.

What can be accomplished in this direction by the concerted endeavors of a body of intelligent and conscientious amateurs has recently been indicated by the vast improvement in the character of the lantern slides produced by a certain metropolitan Camera Club, which has so distinctly raised the standard for American slides that those made by the same makers a year or two ago, are now hopelessly relegated to the condition of "back numbers" having only an historical interest.

In the way of portraiture and picture making in general, the vast gain in artistic quality, so plainly noticeable of late, is largely due to the work of such amateur bands of camerists, with time and disposition to follow out new methods and to enter the fascinating fields of experiment. Notwithstanding the marked social inclinations of the amateur photographer little effort has yet been made to provide him with adequate surroundings in which to cultivate this pleasing trait of character.

Most photographic societies are so limited in membership and finances that their habitations partake of little more than the appearance of work rooms, while in clubs founded upon other ideas the social side is always placed well in the foreground.

There must always be some fundamental reason for the existence of a successful club, and when Clubland is looked at analytically, it is found to contain many prosperous clubs based upon the following varied ideas :

Politics—Society—Literature—Art—Whiskey and Cards, and when Photography is added to this collection of motives for the association of men, it may be the last, but certainly is not the least commendable item of the catalogue.

Analyze more accurately and it will be found that the establishment of a great club is more necessary to the photographer than to any of the other classes named.

Politicians get together for motives of ambition, patriotism or spoils, as the case may be, and only use their club house as a meeting ground. Society men gather for purposes of social gossip, and rely upon the exclusive character of their club to confer distinction upon individual members. Literateurs only need the club as a place where a library may be consulted, and where ideas may be exchanged between members and friends. The Art Club is not a necessary adjunct to the production of art, for actual work is never done within its walls, though occasional exhibitions of canvasses may justify the maintenance of the club gallery. Regarding the natural attractions of "whiskey" and "games of chance," as the loadstones which hold certain clubs together, little need be said in this argument, but enough has already been written to justify the inferential conclusion that the photographer actually requires the privileges of a large and expensive technical and scientific plant, a well lighted studio for portraiture, dark rooms, a gallery where frequent exhibitions of prints may be held, as well as weekly tests for lantern slides, and countless lectures and demonstrations given relating to the newer processes and discoveries of the art. Add to this the admitted social disposition of the amateur photographer, and the claim seems well established that his need of an up-to-date club is superior to that of any of the distinguished file of fadists herein named.

It is sincerely to be hoped that at no distant day an appreciation of the possibilities open to the amateur photographer may be crystalized into a Camera Club that will stand as a representative American institution on an equal footing with the clubs of other cults, offering to its members all the advantages, social, scientific and artistic, so desirable both in the prosecution of their work and as a means of passing pleasant hours in a healthy moral atmosphere.

Advantages seemingly so difficult to obtain are in fact easily to be acquired when the idea shall take a popular hold upon the minds of the thousands of amateurs who only need to get together in order to accomplish great results.

Of course it rests with the amateur at large to say whether such a club shall materialize, but the mutual association of one thousand camerists paying annual dues not exceeding twenty dollars, would soon place such a club in possession of a comfortable and creditable club house, equipped with a technical and scientific outfit, with which they might enjoy every facility of carrying on their work under conditions that would not only benefit each member but would surely result in the continuous advancement of the art itself.

By MINNIE C. KING.

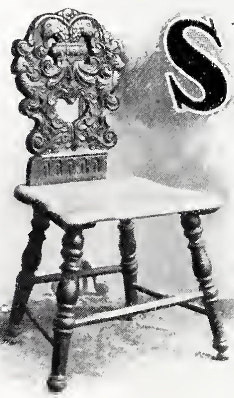
AN ENGLISH HOMESTEAD.

BY M. TUKE TYLOR.

PHOTOGRAPHY'S MOST FAMOUS CHAIR.

BY GILSON WILLETS.

(Sarony relates anecdotes of the Chair of Two Hundred Thousand Sitters.)



SARONY was in anecdote mood. He sat in the chair shown here, and he talked about that chair till he aroused my interest.

"Two hundred thousand," he muttered, partly to himself.

"Two hundred thousand what?" I asked.

"Sitters, man, sitters," he announced.

After a few moments further converse I learned that a full one-fifth of a million of people had actually sat for their photographs in that very chair. Thirty thousand of that number were famous ones. Of the thirty thousand famous ones, fully a thousand were world renowned.

All sorts of conditions have migrated to that chair at one time or another—to perpetuate their appearance and to add to the vast store of human documents. In this chair have sat Presidents of republics and prize-fighters of no consequence at all. Here have sat United States Senators, Foreign Ministers, Princes of the Blood Royal, titled personages and personages without titles but with true greatness.

BOOTH.

Sarony in his anecdote mood, spoke first of James G. Blaine, then of others, and of still others, all famous. I give a few of these anecdotes here because I remember them, and because they are interesting.

Said he, "James G. Blaine was

OLGA NETHERSOLE.

sitting in my studio in this very chair in the autumn of '84, waiting to have his picture taken. It was the very day—in fact the very hour following that in which was let slip those famous words—rum, romanism, and rebellion. My representative, who had been waiting for him at the Fifth Avenue hotel, brought the great statesman to the studio in a carriage. While waiting for me to adjust the camera Mr. Blaine reeled off a story or two with his keen sense of humor, and with unusual light-heartedness, all unawares that at the same time Archbishop Corrigan was being informed of Burchard's silly speech made that day, and while a circular was being prepared which lost Mr. Blaine the election. When he had finished his story he asked if I was ready to take his picture. 'It is taken,' I replied. I had caught him just at the right moment, when he was reaching the climax of the story. This photograph is quite the best I have ever taken of him.

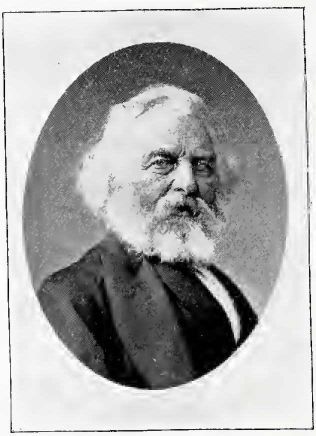
MAUDE BRANSCOMBE.

"Lester Wallack, recognised in his time as the handsomest man on the stage, has I regret to say, only one or two photographs that do him justice. And this, sad to relate, was through his own fault. He was so strong headed, so self-willed, bound to be his own photographer. Instead of

MARY ANDERSON.

lending himself to me as an artist, he would say imperiously, 'Take me this way.' When I begged him to change his position just a little he would only say, 'No, no, take me this way.' So, vexed with his obduracy I complied with his order. Result, a crude, awkward, bungled picture, a libel of the handsome, graceful Wallack. Then he would come to me furious, demanding an explanation. 'Why such a wretched picture? Did I not give you full play?'

FANNY DAVENPORT.



LONGFELLOW.

"Some of the greatest actors, alas! will not sit for photographs in character. Salvini, Irving, Ellen Terry are among these. When Terry first visited this country, she told me that she had promised some one in England not to sit for a photograph theatrically. And neither Sir Henry Irving nor Salvini will ever sit for any character except Irving and Salvini.

J. K. EMMETT.

The truth is, all three have been so libeled pictorially in Europe that they are disgusted with being photographed theatrically. When such players refuse to be perpetuated in the great characters they personate so well, it amounts to a sin. The photographs of Miss Terry in her private character do not do her justice. Ah! if we could only have her as Portia or Juliet! As for Irving, he is proof against all entreaty toward this end. 'Let me take you as Louis XI?' I asked him one day. But he only shrugged his shoulders. It was the same with Salvini. As Othello, with all his fire and action, he is the ideal jealous Moor. His photograph would set a standard. But, too bad, he doesn't think so."

MODJESKA.

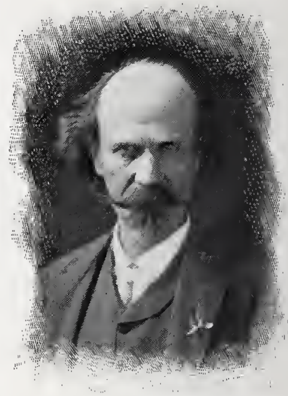
"Strange as it may seem, Dr. Depew has never had a picture taken that does him justice. He never looks natural. If he could be caught unaware some time, during a political speech or in a merry moment, when he is reaching the point of an after dinner story, Depew could then see himself in a photograph as he really is. It is evident, therefore, that some men can be photographed to look naturally only by means of a snap shot. But the shot must be made by a sharp-shooter. There is always one certain position that a man appears at his best. This one position the photographer must discover, and that quickly, and seize his opportunity to take a picture the moment the man is in that position. When Mr. Wilkie Collins came to me, I discovered at once a peculiarity of facial expression

BLACK PATTI.

BERNHARDT.

when he talked about his own books which was most interesting, so while he answered kindly a question or two from me about his 'Woman in White' I made a quick exposure, feeling that I had taken the great novelist at his best. And so it proved. When he returned to England, he wrote me that I had taken just the sort of photograph he liked, and that he felt like giving the photograph I had taken to all his friends.

SALVINI.



JOAQUIN MILLER.

"The advantage of artistic training was shown to great extent in my photograph of General Hancock. The campaign photographs of the general showed him as wearing a goatee. This was the cause of some wonder, as it was known that General Hancock had not worn this appendage since he had thrown off the uniform of the war period. After I had taken his picture I placed my hand over the lower portion of his face,

LANGTRY.

LANGTRY AND BERNHARDT.

informing him that he had splendid eyes, a strong mouth, a good nose, but that his chin was weak. 'You need a goatee,' I said. He assented. So I drew a tuft of hair over his chin on the negative, thus explaining the warrior's goatee photographs.


MARIE WILKENS.


ROSINA VOLKES.

"I am glad of this opportunity to speak of Miss Ada Rehan, who for one so successful, is so modest and so unassuming, taking in good part all suggestions while posing. The natural result is that I never have any difficulty in making good pictures of her. She is as naïve off the stage as on, is always natural, graceful and sensible.


CHRISTINE NILSSON.


HORACE GREELEY.

"The last picture I made of Mark Twain was also a snap shot, and was also the best I have taken of him. I met the humorist on the street. His long iron gray hair tumbled over his coat collar and stuck out from under his hat, giving his head the massive appearance of the old type of patriarch. 'Mark Twain,' I said, catching hold of him, 'I want you to let me photograph your head just as it is. Don't go to the barber until you see me.' He consented and came to my studio the next day, when I secured a photograph of which I am justly proud.

"Another instance was with Sir Edwin Arnold soon after his arrival here. He wished me to make a photograph wherein his nose should be a straight nose. The English photographers, he said, never made that feature look right in his pictures. I observed him attentively a moment. 'Sir Edwin,' I said, 'when you were a baby you sucked your thumb, pressing your fore-finger against the right side of your nose, and making there an indentation which, to a trained eye, is still perceptible.' Then I simply photographed the left side of Sir Edwin's face instead of the right side—the side which the English photographers had evidently insisted upon taking. I have often had people ask me which side of a person I usually photograph. Then they will add, 'the right side, of course. That is always the best side, isn't it?' And this absurd statement has more than once been made by persons whom I had every reason to suppose were perfectly sane."

STRANGE EFFECT OF A BREAKING WAVE ON TO THE BRIGHTON (ENGLAND) PROMENADE. By PAUL MARTIN.

A DAUGHTER OF THE NILE.

BY E. DONALD ROBERTS, JR.

DEPTH OF DEFINITION.

BY CHAPMAN JONES, F.I.C., F.C.S., F.R.P.S., ETC.

A BURDENED BRAIN.
By CHAS. N. WHEELER.

THERE is one very great advantage of the modern anastigmats and similar lenses that is too often overlooked, namely, the far superior depth of defining power that they have as compared with the older lenses under similar conditions of aperture and focal length. The various "depth of focus" formulæ and tables that have been published from time to time refer only to the influence of aperture and focal length, and it has been taken for granted by many and emphatically asserted by some that nothing else has any effect upon this desirable quality. It is far otherwise, however, unless only a very small angle is included in the photograph, a smaller angle, probably, than we see in any view or portrait. In fact, as soon as the superior covering power of the modern lenses begins to be manifest, so soon does the increased depth of definition become of practical advantage.

The rules that have been given apply only to the center of the field, and when limited to this part of the photograph they are useful even in comparing different lenses together, provided that badly-made lenses are excluded. But a photograph does not consist of the small central part only, or even chiefly, and every photographer of experience knows that it is towards the margins of the plate that there is the most trouble in getting satisfactory definition. It is just here that the anastigmats show their superiority in depth of definition. If we used only the very center of the field, the modern improvements in lenses would be worth nothing to us, indeed taken as a whole the newer lenses would often be inferior to the old on account of their larger covering power and the quantity of obliquely transmitted light which would be not only useless but detrimental.

It is chiefly in the size of the field that photographic apparatus differs from other optical apparatus, and if this fact is ignored, as it too often is in formulæ and rules, the most important advantages will be passed over as valueless.

"MEMORANDA PHOTOGRAPHICA."

BY DR. N. B. SIZER.

EDNA WALLACE HOPPER. By SARONY.

A VERY successful developer, made for sale, has been much liked, and the dealer, making only a quart at a time at first, found it sell so well that last season he was compounding it in five-gallon batches, every ten days or so. As it seems to keep well, and to be much appreciated by amateurs who have little time and less chemical knowledge, I am permitted to give the formula:

PYRO-METOL DEVELOPER.

Take of

SOLUTION A.

Pyrogallol.................... 55 grains
Metol.................... 45 grains
Potassium metasulphite........................ ..120 grains
Potassium bromide........... ... . 15 grains
Distilled water, a sufficient quantity to make 19 fluid ounces U. S. P.
Mix well and dissolve thoroughly.

Take of

SOLUTION B.

Sodium carbonate....................4 ounces avoirdupois
Distilled water, enough to make 19 fluid ounces U. S. P.
Mix well and dissolve.
In use, take equal parts A and B for a normal exposure.

Varying the proportions can be done, if needed, or it can be used more diluted, if the exposures are abnormal or uncertain, following the usual rule in such cases to secure greater detail, or density, as the case may require.

A "reliable" paste for mounting! Where "Higgins's Photo-mounter" can be had, few will trouble to make their own, but the following formula is an excellent "sticker" and photographically unobjectionable.

Take

Best laundry starch in powder..........	1½ ounces avoirdupois
Gelatine, best (Cox's, or French "gold label")...........................	120 grains
Alcohol, 95 per cent......................	1 fluid ounce
"Formalin," a 40 per cent. solution of "Formaldehyde" in water	30 drops
Distilled water............................	16 fluid ounces

Soak gelatine in water and heat to boiling. Rub down starch in a mortar with cold water to a cream and pour the hot gelatine solution upon the starch gradually, stirring all the time till an evenly transparent paste forms. When nearly cold, mix alcohol and "Formalin," and stir it well into paste and *at once* pour into a wide-mouth jar and cover hermetically. Keep cool and take out a little as needed. I have kept it several years without souring.

To "Back" Plates.

The usual sort of paste made of caramel, burnt sienna and gum is effective, but messy, nasty, and spoils plate-holders except with great care in its use.

The following will be found as good and much nicer.

Take

Castile soap in powder............	½ ounce avoirdupois
Alcohol, 95 per cent..............	10 fluid ounces U. S. P.

Mix, shake and let stand till dissolved, say a week.

Filter through paper and dissolve in the filtrate:

"Erythrosin" } "Aurin" } of each........................	50 grains

Paint back of plate; it dries in a few minutes. Wipe off with wet rag before developing. Perfect protection from "halation."

BONALIN MAGINN.

SIMPLICITY IN COMPOSITION.

BY FREDERIC FELIX.

A MEMBER OF THE FAMILY. By ALFRED CLEMENTS.

IN the composition of a photograph the desire to crowd is usually the mark of a beginner or one who does not look to or care for the perfection which comes with a thorough knowledge of the manipulation of a camera according to the rules which make for artistic results. If a novice desires from the first to have his efforts advance steadily to the artistic, or if one, who after working to some degree of proficiency in the general lines of photography, seeks to make his work serve a higher purpose, one of the best things to be offered either, would be the admonition to strive for simplicity in composition. Let a worker keep simplicity in mind and artistic advancement will surely be a result. When a photograph is robbed of a multiplicity of unnecessary details it relieves the operator, because more critical attention can be paid to a simplified grouping and better effects can be gained. It also relieves the one who is to view the picture by presenting the object in such a manner that the eye does not have to falter in the selection of what is intended as the principal part of the composition

When the main object in a photograph is divested of unnecessary surroundings it gives a chance to study that particular thing in itself and to get the best effect. And gaining a knowledge of recording things as near their unobstructed selves as possible will give one the better opportunity to add others, and to make the grouping more elaborate when it becomes desirable and necessary. It is like the student in drawing who is given practice on the separate members of the body. A head or foot, if well made, can show the artistic skill and temperament as much as a presentation of the entire form, while perfection in the members serves to make perfection in the complete work.

Simplicity in painting often wins the artist of the brush more renown than the most elaborate presentation of detail. There are many paintings which bring out everything to a microscopical exactness, rivalling the reproductive power of the best lens under the most favorable circumstances. The folds and texture of fabrics and other things of similar value are brought out almost clearer than nature presents them to our view. These paintings are admirable for their class, yet the simple "Angelus" outrivals all of them in artistic and intrinsic value, principally because of the charming simplicity with which the masterful genius has invested the canvas. There is no doubt that had such work been expected of a photographer many would have thought it necessary to add to it in the foreground and the background. They would have seen to it that houses, trees and other objects were brought in distracting view, and they would not be content until they had well filled the limits of the plate. But they would not have as a result the triumph of simplicity which the world enjoys as the painter presented it.

It seems to invariably mark the novice to find a photograph crowded with everything it is possible to load the lens. If the photograph is a landscape, it seems there is an effort to get all of the trees from root to top, to get the logs, fences, roads, buildings, etc., just as they stand. If it is an interior, there is usually a desire to show as broad an angle as is possible, and, not content with the furniture of the particular part, all the chairs, tables, floor pillows, musical instruments, and other articles that can be gathered are brought in to make a show. It is also usual to find crowded in the photograph one or a number of people, with the expectation of having the exposure do duty for the greatest amount possible. If it is a single portrait or a group there is frequently the fault of distracting backgrounds, of obtrusive furniture, or of flowers brought in in such a manner that the full value of the picture is lost thereby. In a general composition nine examples out of every ten will almost be sure to show the presence of numerous things intended really to add strength to the picture, which through a faulty perception only rob it of much beauty and effectiveness.

The power of reproducing in exhaustive detail is one that every one will grant to the lens and camera, but the power of judging the composition and making it appear more pleasing than a mere mechanical reproduction is what comes with care and study along artistic lines, and reflects to the credit of the photographer more than anything else can do.

There is everything in favor of the cultivation of simplicity in composition. It is its own reward to the worker who practises it.

SOLITUDE. By T. PERCIVAL PADWICK.

STRAGGLERS.

BY W. BRAYBROOKE BAILEY.

PHOTOGRAPHY AND TAXIDERMY.

BY DR. R. W. SHUFELDT, C. M. Z. S.

TAXIDERMISTS, both in this country and abroad, have not been backward in the use of the photographic camera in their professional work. In making this statement I refer to the advanced students and expert artists who represent the modern school of taxidermy, men who possess a constant sense of pride in their work and in their scientific accomplishments and whose continuous struggle it is to reproduce the natural. To this end, taxidermy upon a large scale in these days, means in so far as our principal museums and institutions are concerned, the reproduction within their halls of animals and their surroundings as they

Fig. 1.—SIBERIAN TIGER. RIGHT LATERAL VIEW.

Fig. 2.—SIBERIAN TIGER. LEFT LATERAL VIEW.

are seen in nature, for the purpose of public exhibition and instruction. To successfully do this, then, the artist finds himself confronted with many difficulties and many problems. Let us say for example that he has been called upon to preserve a fine specimen of the Royal Bengal Tiger, and it is the intention to have the animal surrounded by such objects as would be found in some part of its normal habitat. This might be a bit of jungle ; or it might be in the open; or it even might be the entrance of some den in the rocks, the tiger's lair. In any event, to reproduce these natural surroundings it becomes necessary for the taxidermist to have at hand his models for this part of the piece. These can be only secured by going to the country and place where they are found. Here they are studied as they actually exist, and the mental picture is made as enduring as possible. Then comes in the camera, and all these necessary parts that are to be eventually reproduced again in the museum, are faithfully photographed. General views of the selected place must be taken from a sufficient number of points as to ensure accuracy, and then comes the photography of the details, as plants, character of the ground, and indeed anything that will help in the workshop

Fig. 3.—SIBERIAN TIGER. POSTERO-OBLIQUE VIEW.

and studio at home. Specimens of the plants are now collected and preserved for future comparison; but not only this, for even the heavy rocks and timbers must also be taken and shipped to the museum, where they are to be set up as they were in nature. These field photographs can now have slides made from them, and projected upon a screen, and of course greatly enlarged. From time to time, as this is done, the taxidermist will be afforded the opportunity to reproduce with great fidelity from these views and his imported material, a piece of the country wherein the Bengal tiger is found. Some superb groups of mammals, birds, and other animals have been preserved in the British Museum in this way, and the camera is absolutely indispensible in securing a detailed picture of the normal habitat of any of the forms thus prepared.

So perfect are the modern taxidermic methods employed, that with proper care and protection in a favorable climate, there is no reason why one of these groups should not endure for centuries without any material change. Of course this statement does not take into consideration, accident by fire, flood, or similar agencies. In a case of a group of bison the writer has described in another place, several years ago, it was shown that even the soil of the

Fig. 4.—SIBERIAN TIGER. LEFT LATERAL VIEW OF HEAD

prairie, the peculiar plants of the locality, and the bones of buffalos that had died there, were all imported to make up the group, either in part or in whole. The tracks of the animals were also imitated by the use of the hoof of a buffalo to make the impress upon the ground, and the droppings of the herd in a dried condition ("chips") were also objects of careful importation.

It goes without the saying, however, that the more intricate the natural location is, that it is intended to reproduce, the more valuable is the camera as a means to make a graphic record of the place *before* the material is collected from it for shipment to the museum.

Groups of animals prepared after this fashion are of the utmost importance. In the first place they meet a distinct educational end, for they instruct the visiting public to the museums where they are exhibited; they are an object lesson for students and school children, giving them correct ideas of the character of the country, as well as its flora and fauna, and they are of the greatest value historically, as many animals, especially the large mammalia, in various parts of the world are now being rapidly exterminated through man's agency, and

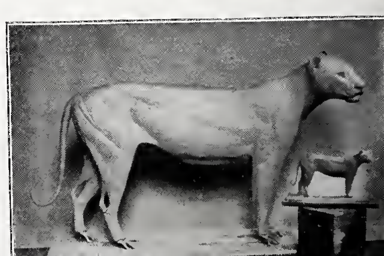


Fig. 5.—MODEL AND MANIKIN FOR TIGER.

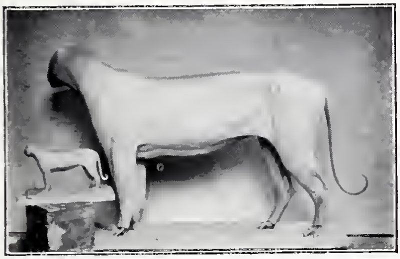


Fig. 6.—LATERAL VIEW OF MODEL AND MANIKIN.

the entire character of the country is being changed through the same means. Where the present writer shot buffalo twenty-two years ago, railroads now pass, and many towns are growing up, and the face of the country materially altered by the introduction of trees and fences. Another use of the photographic camera to the taxidermic artist, and one of prime import, is the securing of good pictures, in all possible attitudes, of the animals themselves. In this line not a form of any description should be beneath his notice. Vertebrates and invertebrates, land types and water types, should all come in for their share in due proportion from the standpoint of usefulness. They should be taken abundantly in their natural haunts, though the inmates of zoöloogical gardens, and studio subjects should by no means be ignored. A great many of my most successful results are indoor pictures of the smaller mammalia and birds. Such pictures serve as graphic models for the use of the taxidermist, as well as for the zoölogical artist. The camera records habits, attitudes, and expressions in a manner that positively defies the pencil and the brush, to say nothing of the instrument as a time-gainer.

Fig. 7.—POSTERO-OBLIQUE VIEW OF MANIKIN OF SIBERIAN TIGER.

Fig. 8.—ANTERO-OBLIQUE VIEW OF MANIKIN OF TIGER.

Useful pictures may also

be made by the taxidermist with his camera, of animals that have died, but this is more particularly the case with the larger species of mammals, and that with the view of securing points in topographical anatomy and correct contours of heads and other parts.


Fig. 9.—EXTREME POSTERO-OBLIQUE ASPECT OF MANIKIN OF TIGER.

After vertebrate specimens are skinned, it is of the highest importance that various operations should be resorted to, to retain records of the exact form of the flayed carcass. Contour here is dependent upon the form of superficial muscles, fat masses, exposed tendons, and various other parts. Plaster-of-Paris casts come in here, but photographs are also valuable adjuncts to these. Many measurements of course are likewise to be made, as well as drawings and special disections, and, finally, the skeleton and its articulations receive the most careful consideration. It will be seen, then, that the camera constitutes a very important aid in carrying out the technical operations of the artist in taxidermy, and above everything else in the photographing of living animals, and these are the chief dependence in the reproduction of living forms. From these and other data the skilled taxidermist, out of various materials, builds up his manikin over which the prepared skin is fixed and arranged, in such a manner, that after

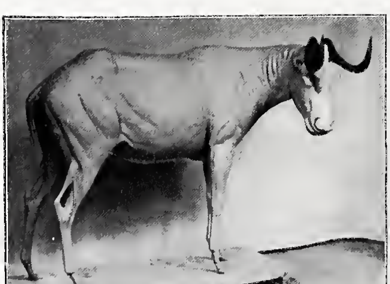


Fig. 10.—MANIKIN FOR A GNU.

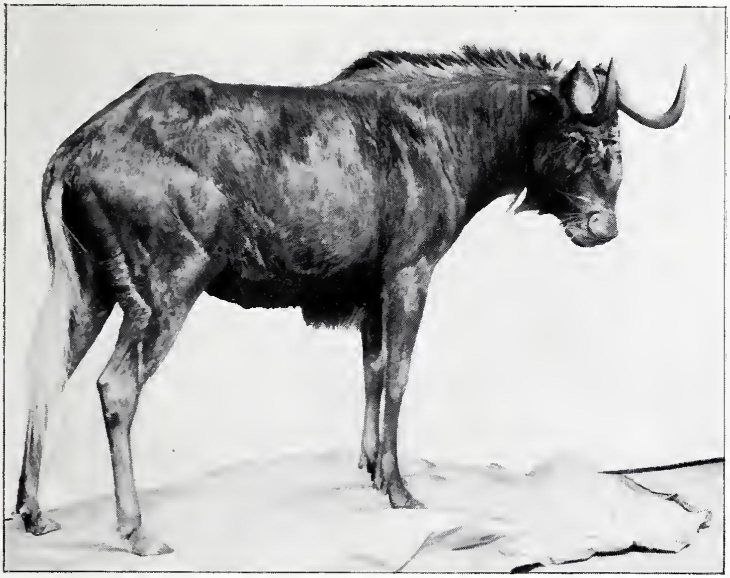


Fig. 11.—COMPLETED MOUNTED SPECIMEN OF GNU.

it has dried, the completed work results in giving the animal the appearance it had in life, and in some one of its characteristic attitudes.

My friend, Mr. H. H. ter Meer, Jr., the talented taxidermist of the Leyden Museum, at Leyden, Holland, has kindly sent me, from time to time, photographs of work done in that institution. Mr. ter Meer is a very close student in his profession, and a most painstaking worker. In the case of all his larger mammals he

Fig. 12.—HEAD OF MOUNTED SPECIMEN OF GNU.

Fig. 13.—HEAD OF YOUNG GNU.

has photographed not only his manikins, but likewise the specimens after they are completed and ready for museum exhibition. He also employs small hand-manikins while at work and finds them very useful. (See figures 5 and 6.)

Mr. ter Meer photographs his manikins and completed specimens, not only from one point of view, but from several in each case, as will be seen by the illustrations to the present article, all of which are reproductions of photographs, presented to the writer, of his Leyden Museum work. Here again the camera plays a useful part, for such pictures as these when kept together constitute a valuable "reference album" for the museum library and records. By being sent abroad, such photographs are extremely interesting to the zoölogist and particularly to other taxidermists. In making his manikins, Mr. ter Meer, Jr., employs a composition of his own invention and manufacture, and for it he claims the most satisfactory results. Judging from his beautiful pictures, it certainly seems capable of being, with marked smoothness, very accurately modelled to take the various forms of the bodies of the animals he so skilfully preserves. But what I have written here is not in the line of criticism, much less an account of a special method in the art of taxidermy, but rather simply to show that the photographic camera is an instrument of great use in this profession, as it is in nearly all the other activities in which men engage.

BLIND MAN'S BUFF.

BY CLARENCE H. WHITE.

SOME HINTS ON HOME-MADE PANS.

BY E. LINGAN BOWLUS, A. B.

By P. BERGON.

IN the evolution of every amateur photographer two important factors, extreme enthusiasm and over-confidence, early differentiate to form the natural trend of result; but indeed a more determinate factor is the financial condition of one's individual exchequer. The intimate relation of the latter to the former is undoubtedly well known to many. If one has a Bank of England at his command, all things are possible; if a Bank of Spain—well, only some things are possible. As an incentive to the study of amateur photography, extreme enthusiasm and over-confidence are meritorious "developments" only when they do not lead to the reckless expenditure of money for useless photographic paraphernalia.

With a plethoric purse the material bonds of enthusiasm are unlimited, but when a wan, pale, haggard-looking little purse looks up into the face of an amateur of moderate means, his enthusiasm is checked, not perhaps until he has acquired much useless camera and dark room equipment as a consequence of this enthusiasm. The result in the latter case is often a gradually increasing neglect of the entrancing field of amateur photography, and the ultimate consignment of photographic outfit to the pawn shop or rubbish room.

It is to those contemplating the study of amateur photography, and to the despairing amateur himself, that I direct the following remarks.

To the amateur photographer pans or trays are indispensible. In fact in order to do satisfactory work a separate pan should be used for each individual act in the operations of development, and the making of the finished picture. These pans and none other should be used for these operations. By accepting this advice we avoid all contamination from the residual salts in pan from previous operations, and thus establish certain invariable conditions that makes easier and more certain the detection of causes of failure in our work.

Especially do I commend to the amateur the so-called "granite" ware of 5c. stores. Pans of this kind are very efficient substitutes for higher priced articles.

A cheaper and just as efficient pan is made as follows:—Having obtained a piece of sheet tin of suitable size, mark off an area in the center, somewhat larger than the size of your plate, at the same time allowing around the margin of this area a certain width about one-quarter of an inch in excess of the desired depth of pan. Clip off the corners to a depth of one-quarter of an inch, and turn over the margins of this sheet of tin by placing them between two straight edged boards clamped tightly in a vice. A smooth edge to sides of pan is thus secured. Before turning over the sides of pan around the lines previously marked off, a cut is made, to a suitable depth, inward, so as to admit of the success of this operation. By a judicious use of the shears at each corner, the proper slant to each side is easily obtained. A projecting flap from side is bent around upon the adjoining side, and soldered with soft solder to the same. Having by these acts constructed a pan from a sheet of tin, it is then necessary to coat it with asphaltum varnish. The exterior can be painted, but it is best to flow the varnish over the bottom and sides of the inner surface of pan. Should it be desired to use the pan for purposes other than that to which it has been devoted, all that is necessary is to recoat the pan.

As a developing pan the objectionable feature to this pan is the black surface it presents to the developing plate, since it is somewhat difficult to observe the progress of development under such conditions.

As an improvement upon the asphaltum pan, in this respect, I suggest plaster of Paris pans soaked in paraffin. All that is necessary is to mould pan to the desired shape and dimensions, and immerse it in a bath of melted paraffin of high boiling point. These pans are easily broken, therefore only small sizes can be used. The working details of this process I leave to the intelligent amateur.

THE HARBOR QUAY. By G. E. MAINWARING.

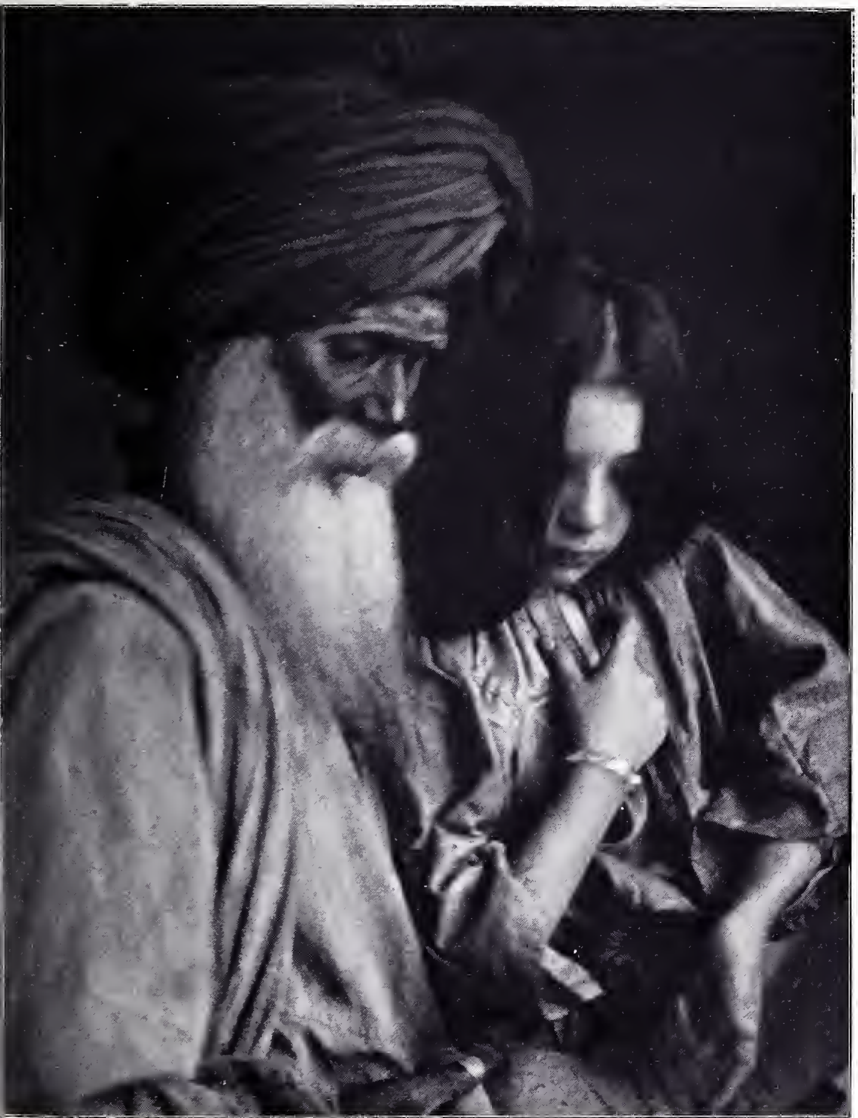
SOMETHING NEEDFUL.

BY CARL RAU.

STUDY. By MORENO.

THE technical part of photography in our days is so simplified for everybody, thanks to some of our enterprising stock-houses, that we are apt to lay too much stress on our equipment of materials, on camera and lenses, plates and developers, etc., etc., and to overlook a few equally as important and necessary factors to insure success to the professional or amateur.

What we have in mind here will not be found listed in the various catalogues of photo materials, although it would surely be to the interest of all our stock-



By SHAPOOR N. BHEDWAR.

DIVINE READING.

houses if a large amount of the article could be sown broadcast into the bosoms of the many workers in the great field of photography.

The article we refer to is nothing less than simple and sober enthusiasm, a necessity for successful artistic work.

The beginner, but especially the amateur, usually starts in with a very generous quantity, in fact the flame of enthusiasm is quickly fanned into a fire, that will often overpower all else and consume itself in the course of a few weeks or months, leaving nothing but ashes and a considerably lighter pocket-book.

During this first wild enthusiasm the beginner will sacrifice everything on its altar, his friends are imposed upon, and whatever else he may come in contact with, is attempted in his wild desire for photographs and pictures ; plates, films, developers, printing papers, etc., etc , are wasted in the most reckless extravagance, without giving his better judgment a ghost of a chance, with results that cannot fail to bring dissatisfaction and disgust to all that behold them, and turning the unfortunate enthusiast into a veritable camera fiend.

Therefore let the beginner especially beware of this intemperate enthusiasm. Let enthusiasm be coupled with judgment and knowledge, and in this connection it cannot be overestimated in the race for the highest goal.

We cannot take up the biography of any of the artists and photographers of note, but that we will find this love and enthusiasm for their art, which has always been their guiding star, urging them on to study, to investigate, to work, and no task has been too hard, no undertaking too great to search out the jewels they have left us.

To such of us as are widely scattered over our broad country and obliged to solve their problems without the assistance of congenial spirits, our photographic annuals and periodicals are sure to become a source of inspiration, especially if gotten up in the tasty and artistic style of the *Photographic Times*, for example, and we would urge every photographic worker to always keep at least one if not several of the best in their studios.

If we are fortunate enough to be acquainted and in touch with successful workers in the same field, it will tend to keep our enthusiasm alive, smooth our path, and help us ever onward to the best within reach in the magic world of art.

COLOR PHOTOGRAPHY—THE JOLY PROCESS.

BY J. STEWART GIBSON, PH.D.*

By WALTER BURKE.

PROF. JOHN JOLY, of Trinity College, Dublin, is the inventor of a process of color photography which has excited considerable interest during the past year. He thus states the problem : "Composite color photography deals with the subjective reproduction of all visible wave-lengths in two stages : a photographic analysis and an optical synthesis. In the first operation the several wave-lengths are caused to produce three separate photographic images, according to their physiological activity in exciting the supposed fundamental red, green and violet sensations." The method consists in the practical application of this principle in connection with another physiological principle, viz., the equivalence of juxtaposition and superposition of colored light when comprised within a sufficiently small visual angle.

In order to show more clearly the nature of this photographic analysis and optical synthesis, let Fig. 1 represent a spectrum with the red end at the left and running through

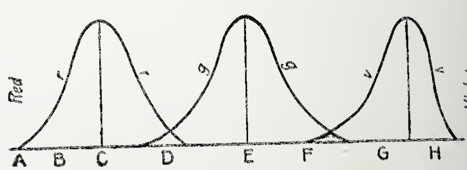


Fig. I.

to violet at the right ; the capital letters indicate Frauenhofer's lines, while the curves marked with the small letters (r), (g) and (v) represent narrow zones of the spectrum

* Montclair, N. J.

with location and color, as shown in the figure. Now it is found that, if from a given spectrum quantities of (r), (g) and (v) lights be taken (the amounts being proportioned to the ordinates X, Y, Z, Fig. 2) and distributed upon a white surface, as indicated by the height and range of the broken line curves (including the "green" curve, which remains unaltered) in Fig. 2, the result is, so far as the eye is concerned, a perfect representation of the spectrum. The ordinates of the curves show the distribution of intensity, while the bases indicate the latitude of each of the colors. It must not be supposed the violet is the brightest because its curve is high, for in fact it is the least luminous, and a relatively large amount is required to produce even its proper low luminosity. If, then, the kind and quality and distribution of light is known, which is requisite to faithfully represent to the mind through the eye all the external color quality, it only remains to obtain photographically this particular analysis of light. This is secured by obtaining in three several linear-areas of a linear-structure negative taken of the spectrum, deposits of silver, the degree of density and range of which correspond to the broken line curves in Fig. 2. From this negative a positive is made, in which, of course, the degree and range of transparency correspond to these curves. If the linear-areas of this positive are backed with material transparent to (r), (g) and (v) color, respectively, and light is projected through it so that the colors are properly juxtaposed, the analysis is completed and the eye has only to perform the act of synthesis.

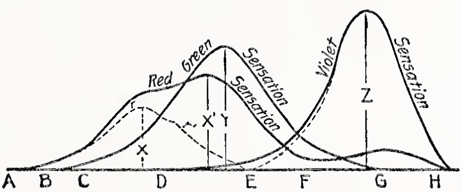


Fig. 2.

The equivalence of juxtaposition and superposition under certain conditions is important. It is a well-known fact that the superposition of red and green light is recognized as yellow by the eye ; and that similar results occur with other superpositions. The reason for this is quite apparent after a little study of Fig. 2 of the synthesized spectrum. Now the juxtaposing of the same colors will give the same derivatives, providing the juxtaposition is properly made. In the Joly process this is accomplished by placing the colors in narrow bands side by side. It has been demonstrated that when the three fundamental colors, taken all together, or by twos or singly, in various proportions, are juxtaposed and presented to the eye so that the combination occupies a visual angle of not more than one minute of arc, the colors are synthesized and the complex color sensation produced is the same as that resulting from superposition. There seems to be a definite limit to the fineness of the structure of the retina, at least so far as color vision is concerned. The term Retinal Unit has been suggested for this small area within which color vision is homogeneous; and, since the visual angle becomes practically an inscribed angle within the eye, the diameter of the Retinal Unit cannot exceed two minutes of arc.

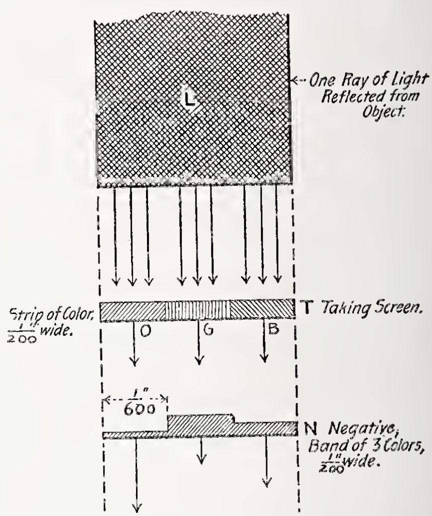


FIG. 3.

A simple computation based on this fact will show that for a transparency viewed at a convenient distance upwards of six hundred lines per inch will be required in order to synthesize the color perfectly. In showing such a picture with the magic lantern it is evident that these conditions with reference to the visual angle must be observed.

The question is often asked why the colors of the screens by which the photographic analysis is effected, that is, the taking screen colors, are different from the fundamental colors employed in the final synthesis. A glance at Fig. 2

will explain this. Examining the curve (r′), for instance, it is evident that the part of the spectrum engaged in producing the silver deposit in accordance with this curve differs considerably from the zone (r) of Fig. 1. It is, in fact, such a part and amount of the spectrum that, taken as a whole, it appears decidedly orange to the eye. The same explanation applies to the other taking screen colors.

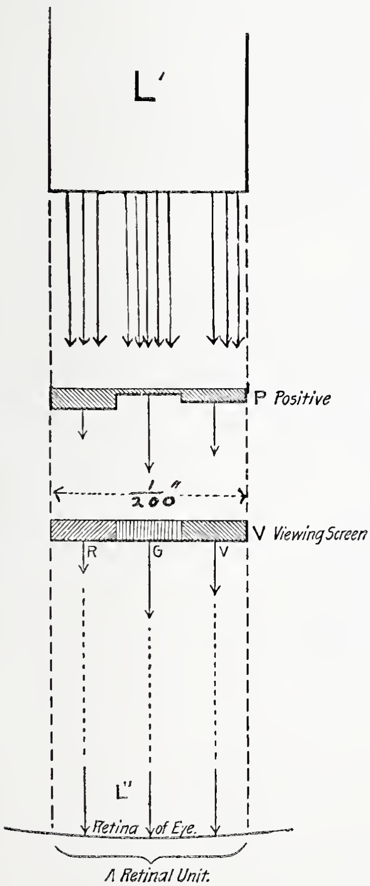


FIG. 4.

In Figs. 3 and 4 the process is represented diagramatically regarding, for the sake of simplicity, one beam of light reflected from the object to be photographed. This beam (L), Fig. 3, may contain any variety of wavelengths, *i.e.*, have any color. Suppose, for the sake of illustration, it is a bluish-green tint, in which case the green sensation will be greatly excited, the violet sensation moderately and the red sensation only slightly. This beam must pass through what is termed the "taking screen" (S) before it can impinge upon the sensitive film of the photographic plate. This screen is made up of tri-color bands, say $\frac{1}{200}$ of an inch in width, the colors used being orange-red, yellowish-green, and blue, in strips, each $\frac{1}{600}$ of an inch wide. These color bands are transparent, the one marked (O) transmitting the spectrum rays from infra-red to the E line (green), the color of the collective ray so transmitted being an orange; the band marked (G) trans-

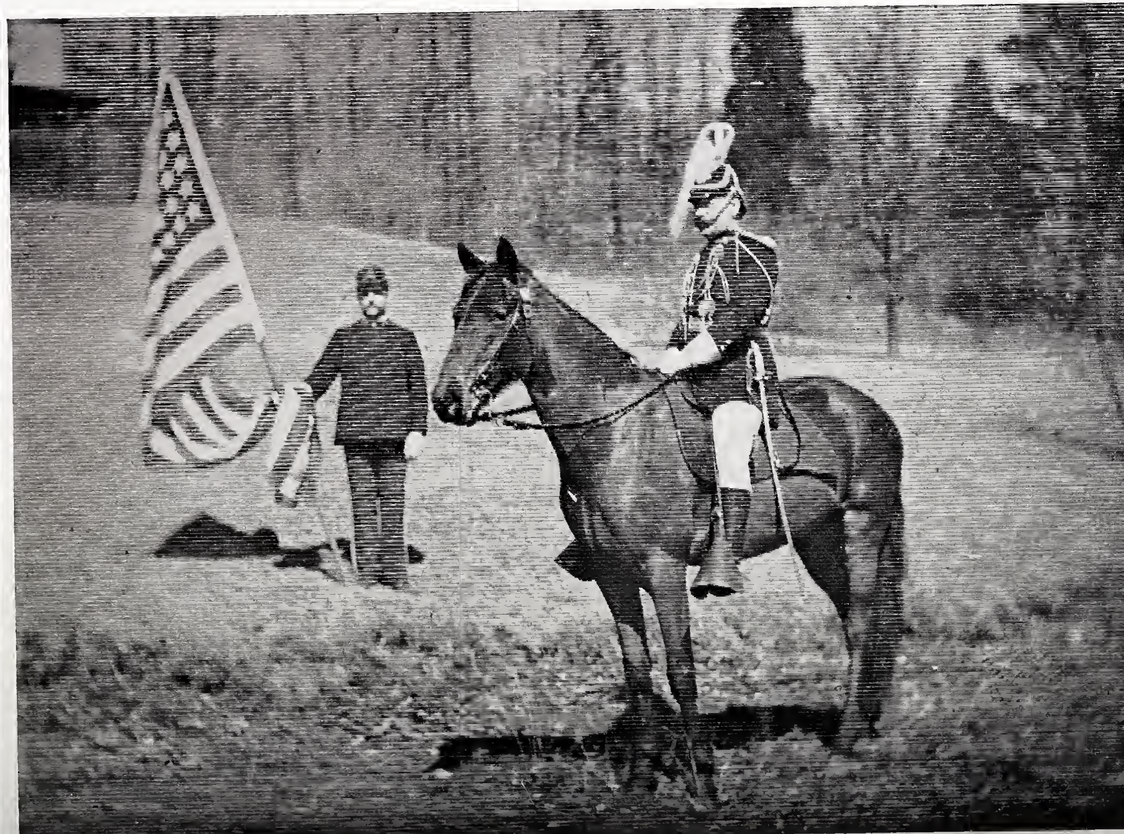


FIG. 5. PICTURE MADE THROUGH A JOLY SCREEN.

mits from the C line to about the G, the color of the collective ray so transmitted being a yellowish green ; while (B) transmits from the E line to ultra-violet, the color being a blue. The light after being thus filtered, impinges upon the sensitive photographic plate (N) which must be panchromatic, that is, sensitive to all colors.

Here the sensitive film is affected by the different intensities of photographic action, and the resulting densities may be represented, diagramatically, by the differing thickness of the plate (N), which in this case will result in a large deposit under (G), less under (B) and very little under (O). A positive (P), Fig. 4, is made from this negative in the usual way, *i.e.*, by contact, in which the densities are reversed and now become transparencies. If now this positive is backed with a "viewing-screen" (V), ruled in the same way as the one previously mentioned, except that its colors are the fundamentals (red, green and violet), with the red over the area corresponding to (O), the green over the area corresponding to (G), and the violet over the area corresponding to (B), the portion of the picture covered by the tri-colored band will be seen in its original colors, when a beam of white light (L') is projected through the combined "viewing-screen" and positive and received on the retina as shown in Fig. 4. The "viewing-screen" analyzes the white light into the three fundamentals, of which the positive, by means of its diversity of transparency, determines the proper relative amount necessary to reproduce (optically, but not physically) the original beam (L). And as the entire plate is covered by a succession of these bands it is evident that the whole object will be pictured in its proper colors.

Fig. 5 is a reproduction of a positive made in the manner described, but enlarged so as to bring out clearly the nature of a plate produced by this process. The linear structure is inherent in the nature of the process, but there are definite limitations, as already shown, under which it is admitted, and these conditions must be carefully regarded.

A STIFF BREEZE.

BY C. F. INSTON

STRATFORD-ON-AVON.

A REMINISCENCE BY WALTER SPRANGE.

LADY MACBETH.

TO all but the aimless the possession of a hand-camera, and the practice of using it as a recreation, leads on to fields of investigation and research into subjects of which the devotee had no thought or conception, until the fascinations of the magical little box lured the mind of its user into the hitherto unexplored paths of higher cultivation.

Like thousands of others who cross the Atlantic, the writer has made hasty visits to Stratford-on-Avon, because it is customary to go there, being a convenient place to reach *en route* between Liverpool and London; but, beyond casting hurried glances at the various objects of interest usually pointed out to visitors, by the carriage drivers who convey visitors around the town between trains, no thoughts were afterwards devoted to the objects seen there.

It was therefore entirely owing to the recent acquisition of a Scovill Detective hand-camera, that another visit to Stratford-on-Avon was deemed compulsory, upon arriving in Liverpool early in the season of 1892. In order to be able to pass the night in Stratford, so as to take advantage of the morning light for making exposures of films, a late afternoon train was taken at Liverpool, and this necessitated the loss of dinner, and also a detention at the railroad junction, pending the arrival and departure of the local Stratford train.

Upon reaching the junction the writer, being exhausted, made the unusual request for "a cup of tea" of the fair attendant at the lunch counter, and while he was leisurely imbibing this mild stimulant, a gentleman entered and called for a glass of ale, then—noticing the nature of the beverage in which the writer was indulging—the gentleman expressed his astonishment at seeing one of his sex drinking tea at that late hour of the night, adding that "a glass of good wholesome British ale would be much more beneficial."

In order to decide this important question the writer accepted an invitation to join the gentleman in a glass of ale, and the results proved far more efficacious than anticipated. All feelings of langour disappeared as if by magic, and the mental faculties became animated to a most unusual degree. A very pleasant conversation followed, in which the habits, traits, and characteristics of the two greatest English speaking nations in the world were pleasantly discussed, followed by a comparison of the growth and importance of these rival nations, in which the writer enthusiastically upheld the supremacy of the United States.

SHAKESPEARE'S BIRTHPLACE.
(Copy of an Old Print.)

Fortunately, by the time that statistics threatened to be necessary in order to arrive at any definite conclusion as to which nation really is the more important, the train was announced. Upon entering the same coach cards were exchanged, and the writer learned that his traveling companion was Mr. Charles Flower, Stratford-on-Avon's generous benefactor.

In course of conversation on the train, the fact that the promoters of the Columbian Exhibition, in Chicago, had made efforts to purchase the cherished Hathaway cottage was discussed. Mr. Flower said: "Yes, but we have headed them off," and recited the particulars of the purchase of it, in which he took such an active and liberal part. The writer suggested that the Chicago people could yet purchase the contents of the cottage. To this Mr. Flower replied: "I should be very sorry, indeed, if any of the contents of that cottage were removed from it,"—adding the prophetic remark —"In all probability, if they were removed to Chicago they would all be burned up; that is such a place for fires."

Upon arriving at Stratford-on-Avon Mr. Flower kindly escorted the writer to the Fountain Inn, and extended an invitation to call upon him the next day.

ROOM IN WHICH SHAKESPEARE WAS BORN.

The Fountain Inn (now closed as an hotel) faces the open space in which stands the Memorial Fountain, presented to the town of Stratford by the late Mr. George W. Childs of Philadelphia, the year of the Queen's Jubilee. Its dials are illuminated from the interior at night, this and the purity of the tones of its chimes, which note the lapse of time every fifteen minutes, really add greatly to the charms of that peaceful place in the stillness of the night air.

MEMORIAL FOUNTAIN.

Early the following morning the writer hastened to the historic house on Henley Street in which the "Bard of all time" first drew his breath of life. As may be seen, upon comparing the present with the ancient view of Shakespeare's birth-place accompanying this article, the house has been so thoroughly renovated that its external appearance at the present time resembles that of a modern cottage, designed after the style of its original period. The interior of the house has not been altered very materially, however, and the room in which Shakespeare was born presents very much the appearance of it given in the old photograph reproduced. Iron laths still support the crumbling ceiling which, as well as the walls and beams, are literally eovered with the pencil marks and knife cuttings of visitors. All the window panes bear marks of this charaeter, made with the diamond, by many of the world's most noted personages who have passed away. The ehair in the corner by the side of the bust is a relic of Shakespeare's time, and is the one mentioned by Washington Irving as "the chair in which it is the custom of visitors to this house to sit."

The house on Henley Street has passed through many vicissitudes. For some years after it had been occupied by

SHAKESPEARE'S BIRTHPLACE (Present Condition).

John Shakespeare, the father of the poet, it was known as the Maidenhead Inn, and later it was occupied by a pork butcher. The house and all the valuable relics it contains are now the property of the "Shakespeare Fund," and are being carefully preserved by the "Birthplaee Committee."

The poet, William Shakespeare, was born on April 23, 1564, and passed his boyhood in Stratford. He married Ann Hathaway in the summer of 1582. Their first child, Susanna, was born in May, 1583, and in February, 1585, their family was increased by the birth of twins. The need of some definite employment to support this family compelled Shakespeare to seek his fortune elsewhere. He left Stratford for

London in 1586, and in time saved up enough money to purchase a small house in Stratford, to which he added later by purchasing the surrounding property, and in 1597, he returned to settle down on this estate, called "New Place," of which only the site and the foundation of the walls remain.

GUILD CHAPEL.

New Place overlooked Guild Chapel (or the Church of the Holy Cross) founded in the 13th Century. The old porch, which can be seen in the view, remains in the original condition in whch it stood in Shakespeare's days The low wall on the left side of the view surrounds the site of New Place, in which Shakespeare resided. It is now a small open pleasure ground and is the property of the "Shakespeare Fund." An old theater which stood on this site for many years was demolished in 1872. A new Memorial Theatre, erected by public subscription on the banks of the river Avon, was inaugurated by a very notable performance on April 23, 1877, the anniversary of the poet's birthday, and, on each succeeding anniversary, certain of Shakespeare's plays are performed in this theatre by distinguished artists selected by the Committee. A Memorial Library and also a Museum with a picture gallery have been added, the expense being largely borne by the late Mr. Charles Flower.

SHAKESPEARE MEMORIAL BUILDING.

It is the desire of the Trustees of the Library to receive and preserve in its archives all literature—Shakespearian in character—which is now or may hereafter be published.

A memorial statue, also erected by public subscription, stands in front of the theater. It is a fine example of modern art, the figures surrounding the base not only represent four of the principal characters in Shakespeare's plays, but they are also life-like representations of the four most noted actors who have personated those characters.

SHAKESPEARE MEMORIAL STATUE.

A pleasant stroll through the grounds along the bank of the river Avon leads to Trinity Church, best known as Stratford Church. It is on the site of a Saxon monastery which existed before the year A.D. 691. The Choir was built in 1465–91, and in the reign of Henry VII. the north and south transepts were added, making it cruciform in structure. The remains of Shakespeare rest in the chancel, covered by a flat stone which bears the following inscription:

> "Good friends, for Jesus' sake forbeare
> To dig the dust enclosed here,
> Blessed be he that spares these stones,
> And curst be he that moves my bones."

STRATFORD CHURCH.

Were it not for the emphatic request contained in the above lines, no doubt, the remains would have been removed to Westminster Abbey. Near Shakespeare's grave are those of his wife, who died in 1623, aged 67; their eldest daughter, Susanna; and Thomas Nash, who married their daughter Elizabeth, one of the twins. The other twin, their only son, Hamnet, died in his twelfth year, in 1596.

Stratford Church is a very difficult object to photograph, being surrounded by a dense growth of trees. The church-

THE RIVER AVON.

yard extends to the river, and it is possible a fairly good view of the church could be obtained in a boat.

An exposure of a celebrated old bridge of fourteen arches, built by Sir Hugh Clopton in the reign of Henry VIII. proved to be a failure. The view of the river Avon, showing

THE HATHAWAY COTTAGE.

the memorial buildings and the church in the distance was taken on this bridge. Another view, which all American amateurs who visit Stratford should try to obtain, is that of the "Ancient House," the early home of the mother of John Harvard, founder of Harvard University, in Cambridge, Mass.

Upon returning to the hotel for lunch, the writer regretted to learn that Mr. Flower had driven there several times, desiring to take him about, but had finally left word that he was compelled to go out of town until night. In the afternoon the writer trod the historic path across the lanes to Shottery, and, upon arriving at the Hathaway cottage, learned that Mr. Flower had visited it during the morning, and had purchased the entire contents of Mrs. Baker, who is the last living descendent of the family of Ann Hathaway. Mr. Flower had also arranged with Mrs. Baker to remain in custody of the cottage during the remainder of her life.

Copyright, 1896, by Walter Sprange. MRS. BAKER.

Mrs. Baker, who is over 80 years of age, being greatly relieved at the definite assurance of a continued residence in the home of her entire life, in gratitude to the writer for his words of the previous evening, waived a long settled preju-

Photo by SARONY.

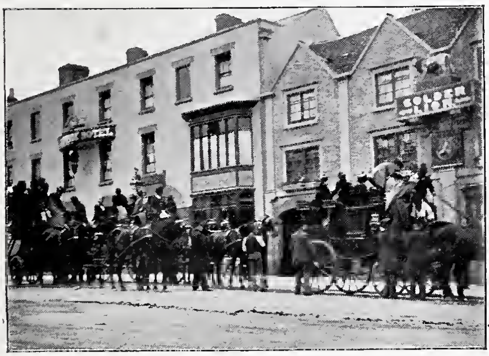
MARY MANNERING.

dice against being photographed, and the result is here published for the first time. Mrs. Baker is seated on the historic old oak bench in the famous chimney corner where Shakespeare is known to have so successfully pleaded his own cause.

SHAKESPEARE HOSTELRIE.

The only portrait Mrs. Baker ever sat for, previous to this one, is a water-color sketch by Whistler, an autograph copy of which he presented to her, and now adorns the living room wall.

The Hathaway Cottage, a charming example of the old English thatched-roof cottage, still contains much of the original furniture of Ann Hathaway's time. The visitor's registers are rich in autographs, the older ones containing the handwriting of many of America's most esteemed men of letters who have passed away since they penned their names in them.



THE "RED HORSE" AND "GOLDEN LION."

The old "Shakespeare Hostelrie" is a well-preserved relic of past days, and closely resembles a similar row of buildings near Staple's Inn in London, revealed a few years since by the widening of Holborn.

As far as American visitors to Stratford-on-Avon are concerned, the fame of the "Red Horse Hotel," adjoining the

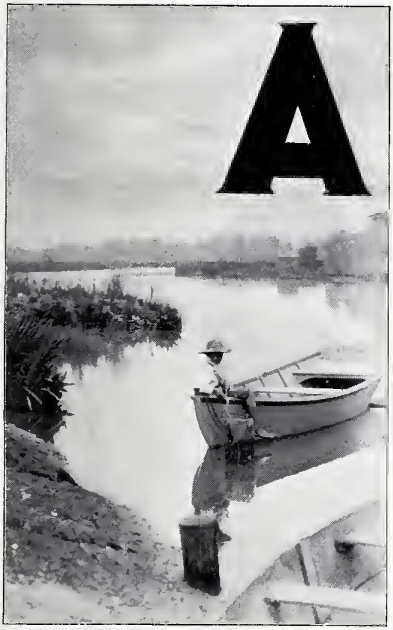
"Golden Lion," was so thoroughly established by its association with Washington Irving, that even the chair in which Irving sat in the little parlor when he wrote his "Sketch Book," has had to be protected by a barrier (evidently the chair does not possess the immortal qualities of Shakespeare's chair), and the iron poker, with which Washington Irving stirred up the coals in the diminutive grate, has also had to be encased in order to prevent its being *chipped away!*

In fact, in some minds there seems to exist a very confusing rivalry between the two immortals. So much so, indeed, that one dear old soul, whom the writer met returning to the Red Horse hotel, was lost in perplexity at her utter failure to ascertain the location in Stratford-on-Avon of Washington Irving's birthplace.

CHILD STUDY. By HOLLINGER

AN OLD PHOTOGRAPH.

BY H. P. ROBINSON.



"STILL WATERS." By GEORGE W. FIRMIN.

A PRINT of a bit of lace and a feather. The color a light warm brown. It has been darker within my recollection, but it has had the misfortune to spend ten years of its existence in a loan collection in one of the galleries of a museum, which "sickled it o'er with the pale cast" of too much light, as is the way with museums. Its age is nearly three score, for it was born in 1839, that year of photographic fecundity, and it is probably one of the earliest photographic prints on paper ever produced, except Fox Talbot's early experiments. It is a specimen of his Photogenic Drawing, and was one of Dr. Diamond's first attempts at the wonderful new art.

Few of those who now practice photography seem to know much, or indeed eare, about anything of the early history of the art which has so much interested the world, made so many fortunes, found so much employment for so little knowledge, wrecked so many lives, caused so much industry, and withal given so much pleasure to unnumbered thousands. And of those who do care to read the early pages as they would a fairy tale, how many have ever noticed how much had to be discovered between the time of the production of this feeble print in 1839, and the production of the first process two years later, by which a negative was developed from which a print could be printed. This was the Calotype process, patented by Talbot, and usually supposed to be discovered by him.

This earliest print was made by soaking a sheet of writing paper in a solution of common salt, and when dried brushed over with a solution of nitrate of silver. This, when printed, was fixed in a solution of salt, and until it had too much show-case it was as bright as when it was given me forty years ago, and although it was never beautiful in tone, it was never vulgar, like pink albumenized paper.

Recollections gather thickly around old relics of this kind, and provoke reflections. Such, for instance, as "Who invented Photography?" A simple question which everybody supposes he can answer. What would photography have been if carried only as far as Fox Talbot carried it the first time? What would photography have been without development? There is very little doubt that we are indebted to the Rev. J. B. Reade for development, yet who ever hears of the Rev. J. B. Reade now? But when the patent was disputed in a court of law, it was held that development was the previous discovery of the Rev. J. B. Reade, who, however, had failed to publish this essential of the art properly. A better fixing agent than salt had to be discovered, and this was introduced by Sir John Herschel in February, 1839. Pyrogallic acid was also one of the materials the art had to wait for.

I am not one of those who think justice comes to everybody and everything in course of time, wait they never so patiently, but I do think "hypo" will gain the good character it never yet had. I believe the time will come when it will be proved that fading may be traced to almost any other cause than hyposulphate of soda. Messrs. Haddon and Grundy's investigations go far toward proving this. Anyway, to return to the facts I was mentioning, a great deal of the future of photography lay in the principle of development and the use of hyposulphite of soda, and it seems to me that in at least these two instances credit is not given to the first inventors.

Thinking over this curious anomaly in our history sets me thinking, though having little to do with the subject of other old prints.

MOONLIGHT AT CATALINA ISLAND.

BY C. C. PIERCE.

Perhaps the most interesting print to an old photographer who still worships his art—as it scarcely seems possible for a modern photographer to do—is the first he produced. Only yesterday I came across my first. It was really a negative of a bust, done on salted paper, exposed for hours in a daguerreotype camera, and not developed. The next was a portrait from life on Calotype paper. The sitter behaved splendidly—while I went for a walk so as not to disturb him. This turned out a fair negative, and the definition was as good as ancient, and, in some cases, very modern times, demand.

It was from this negative my first print was taken, also on Calotype paper, and developed. We had not arrived at albumenized paper in those days. I had taken off the first blush of wonder by previously dabbling in daguerreotype, but still the first print seemed very astonishing. More than forty years have rolled on since that dawn, not one without its tale of photographs, but I remember more about this print than all the rest.

Then follows in the same portfolio, many prints, specimens of the mature art, all sent me not many years afterward by men who had achieved reputations since my first print was made not so long ago, each one illustrating some beauty in selection, or defect in manipulation or material, or improvement in method. It used to be the practice with the early photographers to consult one another on their progress or failings. Here are prints from Roger Fenton, and a letter suggesting a combination picture; he to do the landscape, the figure to be by myself, in similar partnership to that of Lee and Cooper, and Frith and Amsdell, who were producing combination printings at the time. Here is one of the earliest specimens of Alkaline Gold Toning from Hardwich, this process was to prevent fading; here a happy thought from Rejlander, who cared more for the thought embodied than the way it was expressed; and some portraits of the insane—then very famous—by Dr. Diamond. There is one from Bedford to show how well-placed figures improved landscapes, and another to show how intolerable were frock coats and top hats among the scenery of Wales;

and others from Luke Price, Delamotte, Shadbolt, and others (in exchange) of the pioneers.

Here is yet another, a very small one, that may grow in interest as it grows older, being only middle-aged at present. It is the first perfected print by the Collodion-chloride process, or Simpsontype.*

Wharton Simpson brought out his beautiful printing process towards the end of 1864, and this little print was produced immediately afterwards. It is on opal glass, and was made by use of the first batch of experimental emulsion prepared by the inventor, for whom at the time I made many experiments. It is as perfect as when printed, although the state of the case in which it is fitted shows that it has been kept in a damp place for a very long time.

Here is a case which illustrates how improvements sometimes wreck good things. The opal glass upon which this portrait is printed was prepared by simply pouring on the emulsion and allowing to dry. An early meddling modifier, anxious to be identified with the process, suggested an albumen substratum. This was at once generally used, and the prints rapidly faded away, showing that chloride of silver and albumen are not friendly. Not the only process by many that have been ruined by "alterations and repairs."

The modern photographer does not seem to care for his early efforts so much for the sake of science and art as for social considerations. There are two classes of modern photographers, those who make experiments and those who do not. He who makes little experiments often does nothing else, he becomes enamored of the scales and weights; he is a capital book-keeper; he keeps a complete record of every exposure and every print, getting "no fowarder," but the other plunges, though not quite so completely as that man who put an untried camera into his portmanteau and exposed many rolls of films in the remotest corners of the earth, only to find when he sent them to be developed at home that an envious piece of paper which should have been at the back had been rolled between the view and the film in all of them.

* Now in possession of the Royal Photographic Society.

This reminds me of a little episode. I am not curious about the many makes of hand-cameras, and am satisfied if the one I am using will go off easily without much trouble, and not make too many mistakes, but the other day one was put into my hand that really shocked me by its behavior. It did *not* select the view, I will not allow it to rob me of that credit, though I must confess that some extraordinary influence compelled the first result to be upright instead of horizontal, and it was better for the picture, but it did everything else. It gave me such a selection of times of exposure that I took off my hat to the weird machine, and left it to judge for itself, only touching a stud or two and a lever for the looks of the thing, and so on throughout the dozen. Getting tired of perfection in the second roll I presumed to interfere, and tried to get into the same mess as the traveller, so that I may have something to be anxious about, but it was no use, the machine would not misbehave, and I had to endure the monotony of rolling off good pictures without defect almost against my will. I am beginning to be afraid of this automaton that won't let me go wrong. This interferes with individuality,—which is Art! (Kind critic allow me the use of the big A for once.)

To return to early prints, The first of his photographs the ordinary amateur preserves is that counterfeit presentment of his best girl, that "inexpressive she," produced from a negative taken on one of his first dozen plates, which furnishes him for a continual text on which he is never tired of dilating, showing how much better a likeness, how much better and more natural a portrait is when done in a garden than in a stuffy professional studio, by a stupid professional photographer.

Of course it is not every first print that has the young lady for its subject, there is one other theme that divides the attention of the newest recruits to our ranks. This is a fox-terrier in a tub, or barrel. That is how it begins, but by the time the exposure is over there is very little dog left and a good deal of tub, exquisitely delineated and much admired.

"AT THE PASTURE BARS."

BY GEO. W. NORRIS.

ON THE PHOTOGRAPHY OF SHEEP AND CATTLE.

BY DR. R. W. SHUFELDT, C.M.Z.S.

By Dr. R. W. SHUFELDT.

MY photographic experiences with domesticated animals have by no means been as extensive as those with ferine animals; still there are some cattle and sheep pictures upon my record. For example, it was about the middle of May, 1895, when fortune threw me into the farming districts about five miles from the modest little town of Salem, in Washington County, New York. It is a quaint old locality, far removed from all the great urban centers of this country. There in those country homes dwell only a folk, the society of which drew one insensibly back to the times of the Pilgrim Fathers of three centuries ago. But I was after country scenes with my camera, and among country people. Even my guide upon the occasion referred to had never seen a photographic picture taken

SHEEP STUDY. By Dr. R. W. SHUFELDT.

CATTLE STUDY. By Dr. R. W. SHUFELDT.

before, and it was marvelous to note the facial expressions of wonderment at my operations, and these amused me so much, that, later on, even the development of the plate was exhibited to the same person, who after that seemed to regard me as some sort of a wizard and capable of performing the most astounding of miracles. An extended tedious journey from out this wilderness took me back to Washington where the results of my sojourn were seen by others interested in the photography of rural subjects. Some of my expert professional and amateur friends had a kind word to say in regard to a capture or two I had made of sheep and cattle. The recollection of their words has encouraged me to present here one each of these results, cattle in one case and sheep in the other. In the cattle picture there are seven animals standing in the clear, limpid, and rapid stream, while three others are seen upon its banks. Many fine elms make up the middle background, it being finished off by the high rolling hills in the far distance. To obtain this picture, I was obliged to set my camera up, and stand more than ankle deep in the running water, in which, by the way, lived many a fine brook-trout. The May afternoon selected by me for my work was all that any photographer could wish for, both as to a country brimful of interesting scenes, and a fine light, quite in keeping with what Northern New York has to offer in such fields, and conditions. Of course, for a resulting picture to possess any art value the point of view must be chosen with the utmost care, and with a full appreciation of composition and arrangement, and that with an artistic just balance of the whole.

In my sheep picture I have likewise attempted to fulfil these requirements, where a point of view was so chosen, as to ensure that one-half the background should give distance, while the barn seen in oblique perspective, fills up its share of the remainder. The exposure was an instantaneous one, in a strong light, care being taken that the sheep were in middle ground, and that their attention was attracted. These animals are by no means easy to take, especially if the lambs be with the ewes, for the gambols of these seem hardly ever to cease, one or more of them frisking about at all times. The old rail-fence; the white cobbles and cornstalks strewn over fore and middle-ground; the deep shadows beneath the barn, making a fine relief for those animals standing in front of it, are all special features claimed for this particular photographic picture.

PORTRAIT. By HAROLD BAKER.

THE INNER STRUCTURE OF A SNOW CRYSTAL.

BY G. NORDENSKIOLD

THE FERRIES OF NEW YORK.

FROM THE STANDPOINT OF A PHOTOGRAPHER.

BY C. M. GILES.

FLOATING DERRICK.

ONE of the stock subjects of the would-be funny papers has long been the supposed woes of the "commuter" or "suburbanite;" and not the least of these troubles have been those laid at the doors of the ferries. It must be confessed that there are some ferries which merit all the abuse which they receive, and the supply is unstinted; but there are some of these much derided sources of transit which, to me at least, under ordinary conditions of weather, are a source of pleasure and an agreeable interlude in the daily routine. From their decks, also, I have secured many a negative which has been of enduring interest. Many more might

NEW COMERS VIA ELLIS ISLAND.

have been obtained if the camera had been at hand at the right time. It is the old case of "what lots of things we see when we have no gun."

"A DOUBLE-DECKER."

From the decks of these boats, especially if they are of the double-decked variety which is used by some of the lines, can be seen a variety of views that are a never-failing source of interest, and which afford frequent opportunities for effective snap shots.

"ONE OF MANY."

A visitor to the city who fails to take one or more ferry trips, misses views of the city which give ideas of its extent, both horizontally and perpendicularly, which are unique.

The Weehawken and the Fort Lee ferries give interesting views of the upper part of the city, including the Grant Monument. The Pennsylvania ferry from 23rd St., and the Annex from Jersey City to Brooklyn, bring into view many points of interest on either shore, including the docks and ships of the great transatlantic liners. If the trip is rightly timed a near view and possibly a snap-shot at one of the steamers, as it arrives or leaves port, may be obtained. The Staten Island, the Long

MONITOR MIANTONOMOH.

FLOATING GRAIN ELEVATOR AT WORK.

Island City, the Astoria, and the South Brooklyn ferries all are worthy of attention.

And not only from the decks of the boats, but along the shores near their landing places, may abundant objects of interest be found.

To avoid exhausting the patience of the reader I have not tried to exhaust the subject, but merely to offer a suggestion of what might otherwise be by many overlooked. I hope that many may find it leading them to a source of abiding interest.

MOSS-BRIAR FALLS, SHASTA. By C. C. PIERCE.

By F. H. DAY.

A MARBLE.

A PLEA FOR THOUGHT.

BY J. WELLS CHAMPNEY.

IF one desires to study portraiture or pictorial treatment of the human face it may be well to proceed on some systematic lines and this paper may suggest to beginners the pathway to later original successes.

Let us take the profile as point of departure for our studies and see what can be made of it. The beauty of the profile on many old coins proves the wisdom of our choice. In all study the photographer must learn to adapt himself to the inevitable and control it as best he may by his arrangements for light and shade and accessories as well. In the human face we soon learn that some subjects are far more favorable than others for photographic experiment, and learning this the beginner does well to avoid needless worry by selecting the individual with most attractive form and fewest skin blemishes.

Children can readily be found uniting these desirable points and the next problem to be solved is that of becoming lighting and costuming. This latter point is one that demands special thought in all photographic work. Our children's books are so fully illustrated now-a-days that reference can be made to pictures which may serve as valuable hints. Take, for instance, the Kate Greenaway books and note how prettily the faces beam out from under the quaint hats and hoods of the dainty maidens and flaxen-haired lads. See whether you cannot add to this becoming costuming a charm of light and shade, of perfect modeling or of individuality of expression which shall make your work especially attractive. Select with great

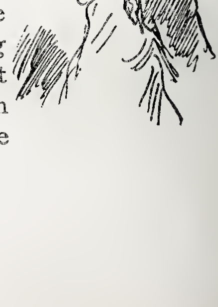
care the backgrounds behind your heads and if you use the entire figure thoughtfully place it so that it is helped, not harmed, by accessories.

Use the "Detective Camera," if you will, but select very wisely the moment when you "touch the button."

In this matter of costuming already referred to you will soon discover that what is well suited to one face or figure ill-becomes another, and yet you will also discover that there are large lines of division into good and bad. If it were only possible to settle for all time

what those lines of good and bad were, how much wasted time would be avoided. Let us see if we can find any general principles to guide us.

Choose amongst your little friends two and teach yourselves good and bad by experiment. Knot a handkerchief peasant-fashion about the heads of both. Try kerchiefs of different colors. Place the children in different lights. Arrange studied reflections. Face them to the light so that the profile relieves vigorously against a dark, or hang up a sheet behind the figure and let the light fall upon the white kerchief from behind, bringing the profile into a tender shadow against the white sheet, which should be in such half shadow as to be darker than the

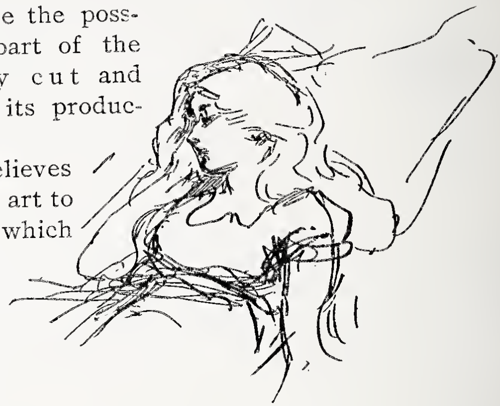


kerchief. Now obtain a variety of pictures—always in profile—with the head looking up, out, or down. Study the results carefully and discover how each *means* something the other does not; how one conveys an impression totally different from the other; how one is more charming than the other. Note specially the value of the amount of white, half-tone and black in your picture and learn for yourselves what proportions please so that you may aim for these proportions.

Having experimented with the kerchief—try other forms

of head gear—the made caps of varying shapes, some of which the accompanying sketches will suggest. Note the *becomingness* of some and the ugliness of others and see if you can find out for yourselves why you like the one and detest the other. You are likely to find that the becoming cap or head dress is one that carries out the lines of face or head, one on which artificial ornamentation of lace or frill has heightened the charm of the face and that the ugly one is too ornate or the added ornamentation contradicts the simple lines which should be heightened not destroyed. A little thoughtful reflection will help solve the problem and your album should be filled with victories and

failures to guide you in all future studies. The object of this paper is to stimulate to personal search for beauty, not to arrogate the possession on the part of the writer of any cut and dried rules for its production.



The writer believes that it is best in art to perpetuate that which is attractive, and that photography can record beautiful forms as easily as ugly ones we all know. Add then to beauty of form, balance of light and shade, and to both, where it is possible, charm of expression.

There is expression of pose as well as of feature and that may be easily seen even whilst making photographic notes of profiles by showing the body in varied relations to the head. To have a little system in your experiments take three positively different attitudes of the body, viz., profile, three-quarters and full front. You will, by the use of these three positions, have data upon which to base future and more complicated experiments. *Confine* your attention first to the profile, as in the combinations suggested already you can find material for much valuable study. Indeed, you ought to be able to face any problem more intelligently if your studies on these lines have been wisely pursued.

To conclude, having made the prints, in cutting them for mounts, note the value of the shape you select, whether square, a parallelogram, an oval, or a circle to be governed by the picture itself. It is rare that odd shapes suit better than these geometrical forms which may be made to increase the beauty of your picture by cutting off objectionable forms or overbalancing lights or shadows. Avoid tasteless commercial mounts and use such as enhance by fitting tone the picture you have thoughtfully made. *Think and choose* from the moment you set your camera on its tripod or point it at your subject. Thoughtlessness and haste are enemies to good photographic work.

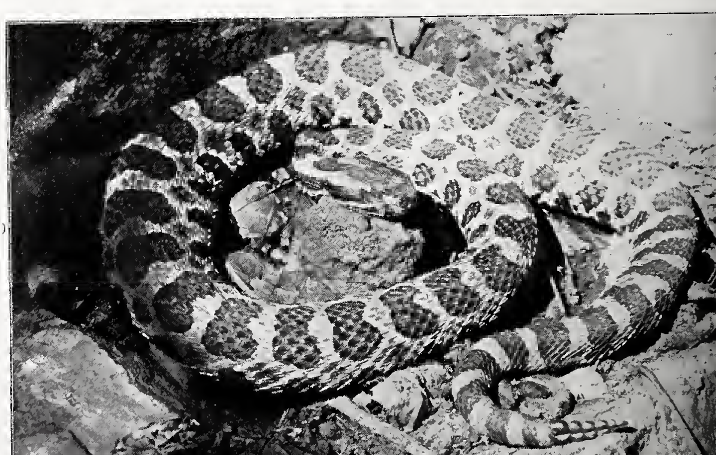
CORRECT A MISTAKE.

BY GEORGE G. BRUCE.

Male and Female Cicadas as they appear after leaving the shell and before their first flight, one-half natural size.

DR. R. W. SHUFELDT, in the June number of the *Photographic Times*, gave a very interesting description of the Red Squirrel, supplemented by some beautiful photographic reproductions of the charming little fellows. It is a pleasure to see those squirrels so faithfully pictured, and the Dr.'s. article should be the means of making many amateur photographers take up the study of the small animals and insects that surround them, and make faithful pictures of them.

The writer has made a study of snakes, tadpoles, and many of the insects that are found in the water of our fish ponds. The photo beneath of a rattlesnake shows their position in defence, most generally shown by artists in a coil, which is not correct. The photos of the Cicadas show them as they are in life.



REAL POSITION OF A RATTLESNAKE IN DEFENCE.

PORTRAIT.

BY MORENO.

OLD WINDMILL AT EAST HAMPTON, L. I. By L. M. McCORMICK.

PRINTING ON SILK WITH THE SALTS OF SILVER AND IRON.

BY H. C. DELERY.

By C. L. BAER.

BUT little attention has been given by the photographic fraternity to this beautiful process, yet its simplicity and the very pretty results obtained should commend it to all. Negatives printed on silk yield pictures of a delicacy and softness seldom excelled by any other process, and its adaptability for decorative purposes cannot fail to find many applications.

Although it has been customary to use the silver salts, equal if not superior effects can be had with Blue Printing. The operation is not a difficult one.

Cleanliness above all, and attention to the smallest details, will ensure good results. The silk should be the best obtainable, white, closely woven and free from blemishes; the kind usually employed for handkerchiefs answers best. All gum and impurities must first be removed from it by a thorough washing with soap and warm water:

Silver Printing.

SALTING BATH.

White gelatine	40 grains
Sodium chloride	60 grains
Water	6 ounces

First dissolve the gelatine by gentle heat and add the salt.

SENSITIZING BATH.

Nitrate silver	60 grains
Water	1 ounce

Neutralize with ammonia.

TONING BATH.

Saturated solution of borax	6 ounces
Chloride of gold	1 grain

The salting solution is filtered into tray, a piece of tissue paper passed over its surface to remove dust, etc., and the silk is immersed for three minutes and hung to dry.

The silver bath is filtered in similar manner, and the dried silk again immersed for three minutes. Care must be taken to lay the silk evenly into the bath, avoiding air bubbles, which, if allowed to form, may leave a white stain. The sensitized silk is now blotted between two layers of blotting paper, and set to dry in dark closet free from dust. When perfectly dry, it is fumed for ten minutes, then lightly sewed around edges to some stiff paper, so that it will not move when examining the progress of printing. The printing must be carried very far, fully twice as much as for albumen paper.

Before toning, the silk must be washed in several changes of water to remove all free silver. The toning bath should always be fresh; an old bath might discolor the silk or cause stains. The toning is done in same manner as for albumen paper, and when desired color is reached, the print is fixed for 20 minutes in

Hypo	1½ ounces
Water	10 ounces

After which wash well.

Blue Printing.

For this process the silk is first subjected to a bath of partially soluble gelatine. The ordinary salting solution for silver printing will not do. Prints made with it are flat and lacking in contrast.

GELATINE SOLUTION.

White gelatine	25 grains
Water	10 ounces

BICHROMATE SOLUTION.

Bichromate of potassium	15 grains
Water	1 ounce

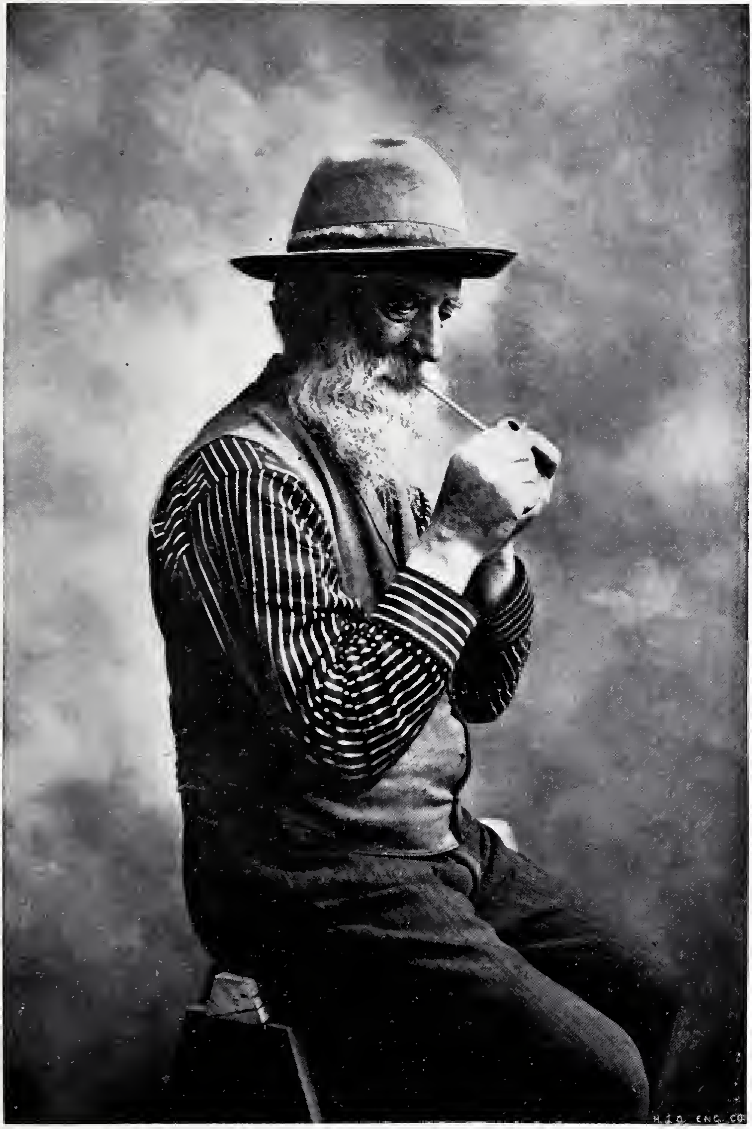
Dissolve gelatine by gentle heat and add bichromate solution. This must be performed in dark room by yellow light. The washed silk is immersed in this bath for four minutes, then hung in a dark place until thoroughly dry, when it is sensitized by immersing for three minutes in the following

SENSITIZING BATH.

Citrate of iron and ammonia	420 grains
Water	4 ounces

Ferricyanide of potassium	300 grains
Water	4 ounces

Dissolve separately and mix equal parts of each. This must be done in dark room. The silk is again immersed for three minutes. When dry it is ready for printing. The picture will not print out very much, when shadows begin to bronze is about sufficient. The prints when taken from the frame are washed in several changes of clear water, then dried spontaneously. Whilst wet they will still be quite dark, but will clear wonderfully when drying.



HIS BEST FRIEND.

BY E. NICOLAI.

IMPROVING A NEGATIVE.

BY CHAS. L. LOCHMAN.

LETTICE FAIRFAX. By B. J. FALK.
Copyrighted, 1898.

DOCTORING or improving a negative from the reverse side may not be new, but possibly my procedure may differ from what has been employed. It often happens that there are parts in a negative that print entirely too dark, in which most of the detail is lost, and which can not be remedied on the face of the negative.

I take half a dozen, or more, of newspaper cuttings, several inches each way larger than the negative and place them on a table. One or two sheets are now drawn through water or wetted with a sponge, and replaced with a dry sheet on top, on the pile of cuttings. With the flat of the hand smooth out the upper sheet until it is free from wrinkles. On this place a piece of fine, white, French tissue paper, about half an inch all around larger than the negative, and when smoothed out place the glass side of the negative down upon it, leaving the tissue paper extending an equal width around the negative. Now run a brush with starch or flour paste along one side of the projecting tissue paper, and with the newspaper sheet below, turn over the edge so that a narrow part is pasted down on the face of the negative, and proceed in the same way with the remaining three other sides; then set it up on edge and allow it to dry. This leaves a smooth, tightly stretched surface to work upon. If the negative is not varnished care must be taken not to get paste or water upon it.

Now have at hand some fine powdered, black lead, such as electrotypers use, or rub a No. 2 lead pencil on a whetstone, or rough paper, to get some powder. Hold up the negative to the light, film towards you and begin to shade off on the back by applying the finger, first rubbed on the black lead, and gently rubbing over the tissue paper, until the shadows are softened; but do not try to get rid of all the deep shadows the first application. I find it advantageous to repeat the whole process with one or two sheets more of tissue paper, to soften the shadows and prevent the markings of the texture of the paper when printing in bright sunlight. The sharp outlines must be touched up with the point of a No. 2 lead pencil, and also the parts that are too contracted to be touched up with the finger. By this means you can improve the negative in a number of ways which will suggest themselves to the intelligent operator.

In place of black lead, finely powdered burnt umber, vandyke brown, or some other dark, dry paint, in fine powder, may be employed, especially where broad masses are to be shaded uniformly; and then if the parts are outlined with a lead pencil, the negative can be laid down on its face and the color can be more readily applied on the back. I have used both the black lead and burnt umber.

"I WANT MY MOTHER." By E. B. TEFFT.

AN IMPROVISED TRIPOD.

BY WILLIAM ARCHIBALD.

WHO SAID THISTLES? By W. BURKE.

OF COURSE we should take a tripod along when going out into the country to photograph, but we are lazy and it is so easy and handy to carry a hand camera that nine times out of ten we don't do it. But what crank has not wished (and how he has wished) he had a tripod with him while in the woods where to try a "snap" would be to court failure.

In the woods, or along a country road is where you want and where you can get any number of tripods, in fact, the woods are full of them! All you need is a stout pocket knife and a good sized handerchief; no other preparation being required. This is the way to do it: Cut down three saplings (you may be able to find branches lying around that will do your purpose), taking good stout ones. They will make it strong and rigid. Cut the pieces about five feet in length, tie your handkerchief about a foot from the top around the three sticks bunched together. Now spread the pieces and you will have an old-fashioned gypsy tripod. Set your camera in the crotch of the three at the top and there you are—ready for a time exposure.

One can be made in about five minutes. This can be thrown away and another made when next you need it.

MOTHERLESS. By L. M. McCORMICK.

HOW TO CARRY A LARGE CAMERA ON A BICYCLE.

BY L. V. KUPPER.

One of the best and easiest means to get from one place to another in any location, especially during the summer season, is, perhaps, the bicycle. You are not obliged to wait for time, train, horse, or driver, only once in a great while from excessive rain or mud. It is one of the few vehicles which is always ready and never in the way. Now it is useless for me here to describe the merits or demerits of the wheel, nearly all the world is well acquainted with its many useful qualities, but how about the photographer—how can it be made to give him more service.

As for myself I can only say that as long ago as ten years, when the old ordinary high bicycle was at its *height*, I have carried my 5 x 7 camera, 3 double plate-holders and tripod, on the handle-bar. I very well remember carrying this same outfit a distance of thirty miles, all up hill, against a strong head wind, and yet I made much better time than carrying it myself afoot.

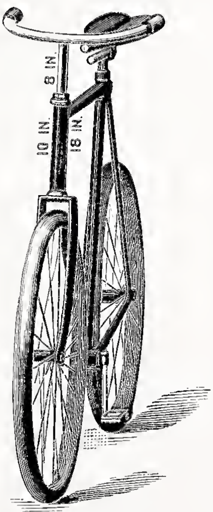


FIG. 1.

The present type of safety is much better adapted to carry a camera, and many manufacturers are taking advantage of the demand, and are supplying such instruments to fold up in a very small compass, and of light weight.

There are some very novel and ingenious cameras for cyclists in the smaller sizes. I have tried and still use some of these now, but most generally carry an 8 x 10 or 11 x 14 camera on my wheel; the method of carrying such a large and rather bungling outfit I am about to describe.

Choose a wheel of rather medium weight and special strength of front fork (crown fork is the best), and extra long head, say 10 inches, so when the handle bar is raised to its full height it will be about 15 to 18 inches from the front wheel. Then measure the height and width of the *camera case* you are intending to use. Then make a sort of box of planed whitewood inch lumber, one board to correspond to the height and width of your *camera case*, the second to correspond to the length and width of the bottom of the camera case. Join both these boards together with extra long screws or wire nails (see Fig. 2,) so that it will look like Fig. 3, front view. Then brace the bottom board to the back board and it will almost look as if you were making a baby seat. Then cut two holes through the upper edge of the back board for two leather straps, a little heavier than

FIG. 2.

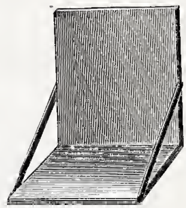


FIG. 3.

skate straps, and another near the lower edge of back board, fasten the upper two straps around the handle bar, one on each side of the stand, four inches from center of bar, and the other around the head itself, just above the fork, and then all you have to do is to set your camera upon and fasten to keep from rattling. The two pictures accompanying this article were made with a 11 x 14 camera, carried in this way four miles after quite a thunder shower, when the roads were heavy and muddy. I find this carrier by experience to be all that is required for short distance runs.

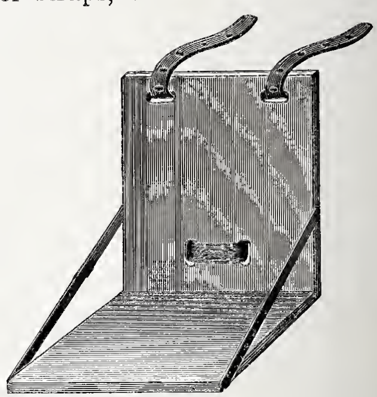


FIG. 4.

When the 8 x 10 camera is used I carry 6 double holders, twelve plates. In addition to the 11 x 14 camera I carry 3 double plate-holders, 6 plates, and often extra lenses, and always tripod. Have carried sometimes as much as 25 pounds in this way.

By J. L. NIX.

REFLECTIONS.

"WHEN THE DAY IS DONE." F. J. HOXIE.

A THREE-LEGGED HORSE.

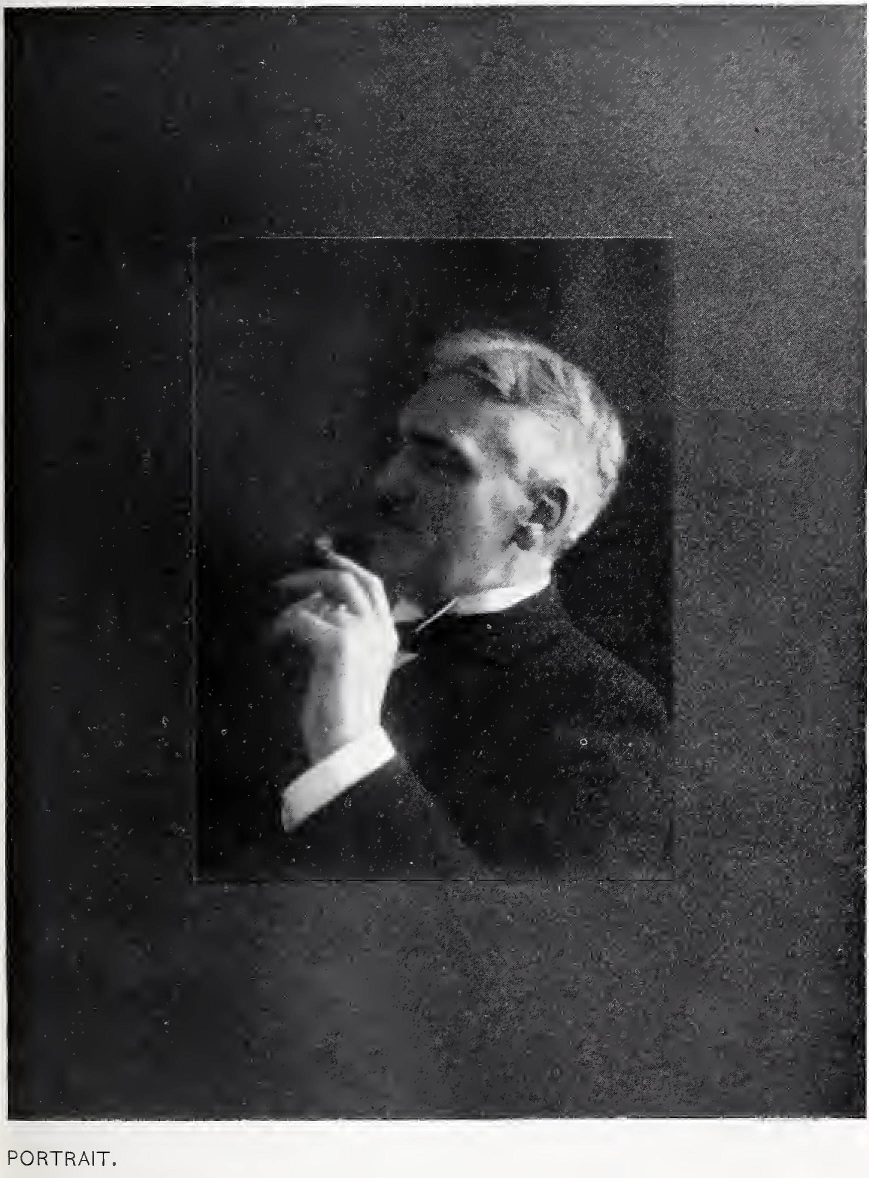
BY CHAS. REID.

TWO OF A KIND. By Redman.

STRANGE things there are in this world, but did ever anyone see a three-legged horse? The accompanying portrait taken by the writer is well calculated to revive the debatable question—"Can photography be relied upon as truthful?" In a general way, with limitations and allowances, it is quite safe to hold to the positive view. It need not be denied that with defective apparatus, or the best apparatus unskilfully handled pictures may be produced that are little better than caricatures of the subjects photographed. Leaving the abstract consideration of the question, let us turn our

A THREE LEGGED HORSE.

attention to the picture that illustrates this brief contribution to the ALMANAC, and ask whether the portrait of the animal is a true one. The owner would at once reply that to represent his animal as having only three legs was a libel on his favorite, and he might justly decline to accept the portrait at the photographer's hands. The latter might insist that as it was the sun that had done the work it must be correct even although the fourth leg were invisible. His apparatus had never been known to play him tricks, and he could avow that the photograph had not been tampered with in any way. He had seen with annoyance that simultaneously with the exposure of the plate the animal had kicked up its hind leg, probable to dislodge some troublesome insect that would persist in settling on its flank. He doubtless regarded the plate as wasted, but being curious to know what sort of impression had been made by the sudden *fling*, he put it in the developer, when, lo and behold! he found this photographic curiosity—a horse with three legs, the fourth having been actually flung away.



PORTRAIT.

BY E. LEE FERGUSON.

SOME ONE COMING? By L. M. McCORMICK.

THE SOLUTION OF TWO PROBLEMS IN LIGHTING NEGATIVES FOR MAKING BROMIDE ENLARGEMENTS, OR LANTERN SLIDES.

BY DR. A. CLIFFORD MERCER.

"AT THE EDGE OF THE WOODS," By GEO. W. NORRIS.

THE solution of two problems in lighting negatives for making bromide enlargements, or lantern slides, may interest such workers as have been puzzled under similar circumstances.

An upper story window overlooking the roof of a near building was used. The roof and the window were on about the same level. The window was darkened with a shutter in which was a rectangular hole fitted with a plate of ground-glass. The plate was somewhat larger than my largest negative. A camera was adjusted horizontally in line with the center cf the plate.

On supporting a negative a short distance from the ground-glass and taking a positive in the usual way, the result was quite unsatisfactory because only the upper half of the negative had been well lighted. While ground-glass under the above conditions becomes itself a source of light, it also transmits some direct light from outside sources. In the present instance the direct light from the sky was more effective than that from the building.

For the ground-glass was substituted white tissue paper. The paper transmitted no direct light. It became a uniform and satisfactory source of light behind the negative.

A plate of ground-glass supported between a source of artificial light and a negative diffuses the light, but not satisfactorily; for while the center of a negative may be well lighted by such an arrangement, illumination falls off rapidly with increasing distance from the center. A pair of plano-convex condensing lenses may be satisfactorily used instead of the ground-glass. Such lenses are used to illuminate a negative in the same way that the condenser is used to illuminate a slide in a projecting lantern. In enlarging from sufficiently small negatives the light and condenser of a projecting lantern may be used. But to illuminate larger negatives in this way larger condensing lenses are required. Large lenses are costly.

Occasionally a single large plano-convex lens from an old —now seldom used—solar camera, may be bought for a few dollars. To match such a lense, to secure a pair, may mean the expenditure of fifty or sixty dollars. To avoid such an expenditure by making a single lens serve satisfactorily, was a problem which presented itself to me a few weeks ago.

The solution proved to be simple. The focal distance of the lens was found by measuring the distance of the plane surface of the lens from an image of the sun thrown upon a bit of dark metal (which would not burn, or dazzle the eyes unnecessarily), the convex surface of the lens facing the sun. The lens was then supported a little more than its focal distance from the source of light, with its plane surface towards the light. A plate of ground-glass a little larger than the lens was placed in contact with the convex surface. A negative supported a short distance from the ground-glass was then uniformly and satisfactorily illuminated.

A PLEA FOR ARTISTIC WORK.

ROBERT E. M. BAIN.

SEGO LILY. By R. JOHNSON.

PHOTOGRAPHY is now so largely used for illustrating purposes that attention is drawn to the very large amount of mediocre work that is used for book and magazine illustration by publishers; work that is cheap, not good. This is a most unfortunate tendency, for, while we are advancing in the character of the work from a mechanical standpoint, we are retrograding from the artistic point of view, and mechanical excellence is beginning to be accepted in lieu of the more exacting features. The modern professional photographer makes great endeavor to make his work "sharp to the corners" and to cover all the view, back and front if possible, resting under the impression that this is what is wanted. When ordered to make a picture (?) of certain surroundings he almost invariably takes in the whole of buildings in the neighborhood, even though unnecessary, violating in his attempt every rule of perspective.

Requested to secure the best view of some noted garden or residence he is sure to have a bare front with a small patch of yard, and usually has a group of the family or servants staring into the lens. I say this with due respect to the skill of the operator but with little respect for his education. The photographer is not to be blamed, however,

STUDY.

BY CLARENCE H. WHITE.

so much as the publisher who accepts and pays for this class of work, and who expects the public to favorably criticize his publication on account of its profuseness of illustration. Our best class of illustrative work is the half-tone made from pen and ink work or wash drawings by our modern illustrators, such as Remington and Gibson, and that really good work is appreciated is shown by the popularity these men enjoy and the call for their work.

Photographers should give this matter a great deal of thought and not rest satisfied that their work is good enough to command the price they ask for it. The more the improvement the greater the reward. A man who expects to do photographic book or magazine illustrating work should take lessons in art and learn something of "balance," perspective, effects of light and shade, and pyramidal and other compositions that he may know what to select in his work, and he will find to his astonishment that his work will become in greater demand and that he has gradually raised himself above his fellows. No work of preparation is lost, and no man can expect to succeed without a thorough knowledge of his business, be it what it may. We have ample evidence in the best work of amateurs, shown in the annuals and journals, that most artistic work can be done with the camera and without expensive paraphernalia, and that a man can be an artist without palette or brush. It requires training, both theoretical and practical, to do picture work; and, however good a photographer one may be, he cannot succeed by technical training alone.

Publishers should use more discrimination in their selections and require a better standard of work, and thus open a field for the highest class of work and, as the cost of high class work is no greater to the artizan, and the financial reward much greater, there would be an incentive to improve that would be appreciated by those whose taste requires the best, and the best is never too good.

"A PAINTER'S WHIM."

BY G VIEUILLE.

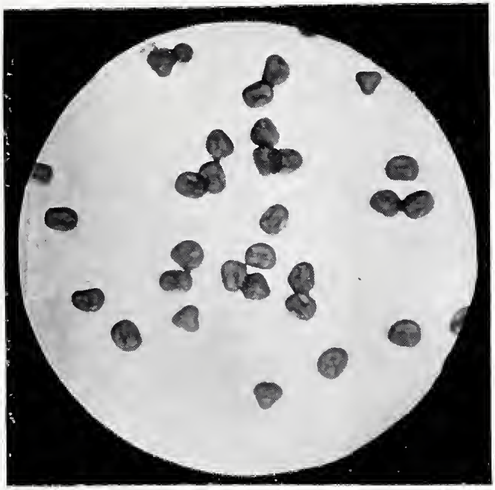
ON PHOTOGRAPHING THE POLLEN GRAINS OF A RED GERANIUM.

BY R. L. MADDOX, M. D., HON. FELL. R. M. S. AND HON. MEM. AMER. M. S.

By P. BERGON.

ON EXAMINING microscopically the pollen grains of some of our common plants, as the daisy, dandelion, groundsel, etc., I was led to look at the pollen of a red geranium, named Ellen Clark, especially as it was of an intensely red color as seen on the stamens, and a more beautiful common object can scarcely be found, when examined with the microscope, as an uncovered object on a black ground, whether by day or lamplight. By sunlight, the object was extremely gorgeous, but the surface structure caused iridescence through interference, so that the structure itself was not satisfactorily seen, viewed under a $\frac{2}{3}$rds objective and a No. 3 Kellner eye piece, using a Shadbolt parabolic illuminator as condenser; with its stop raised to give an intensely black field, and flat mirror, the pollen appeared as rich golden glass globes with an irregular network of rayed patterns depending on venation or

Two-thirds objective T. Kellner E. P., Magnification not taken.


Two-thirds Objective and Projection Ocular.

ridges, with narrow cross-bars set so closely together as to appear under a low power like raised lines. The shape of the pollen grains according to their position appeared either as blunt three-starred or lobed objects, or more or less circular bodies puckered towards a central elongated depression, or as thick flattened circular bodies bounded by a wide half hoop projecting toward the observer. Being much struck with the extreme beauty of the object as thus seen, I was tempted to try and photograph the same; but from the bright golden color did not expect to meet with much success, especially as I had no recent isochromatic plates sensitized for red, at hand. Having no experience as regards exposure under such conditions I was led to suppose the brightness of the object would not, with a $\frac{2}{3}$rds objective and No. 3 Kellner eye-piece with a $\frac{1}{4}$ inch stop over the eye lens and parabolic illuminator, require a long exposure. Five minutes were given at the first trial, but it was found far too short a time at the range selected, when illuminated by light from a 1 inch paraffin lamp wick and small bull's-eye placed for parallel rays. The exposure had to be carried to 14 minutes, and even then the pattern was very imperfectly brought out, and as the Kellner spread out the field only a few grains were enclosed in the limiting circle of light. The $\frac{2}{3}$rds objective was next tried with a No. 3 projection ocular and Abbé condenser, the lamp and small bull's-eye remaining unchanged. This lessened the exposure and magnification, but I failed to get a sharp image with the network shown.

An old $\frac{1}{5}$th objective was next tried, and this did not prove very successful, in fact much more difficulty was experienced than expected, and unfortunately I had omitted to set the collar connection at "uncovered," while the exposure amounted to 16 minutes. During this period the vibration from a train passing at some little distance was so great as to cause the bottles on a shelf to rattle; hence this may have helped to lessen the sharpness of the image, although the baseboard was supported by cross bars resting on india-rubber pads. An old $\frac{4}{10}$ths corrected for the blue and yellow rays, not as usual for claret and pale green, was now set at the near point for an uncovered object, the other items, lamp, and small bull's-eye, Abbé condenser and No. 3 projection ocular remaining the same. The exposure was 13 minutes and furnished rather the sharpest image, but even now scarcely satisfactory. I had, however, wasted considerable time and a few plates, so submit only the two best negatives for illustration. The magnification with the $\frac{4}{10}$th objective was 133 diameters. The object had a most fascinating beauty as seen under the microscope, but without extended trials it seemed hopeless to obtain a really good negative. The original intention was to try and get stereoscopic illustrations. Enough, however, has been said to call attention to a common but most beautiful object, quite worth a patient examination, and may, it is hoped, be of interest to some of the numerous readers of the ANNUAL.

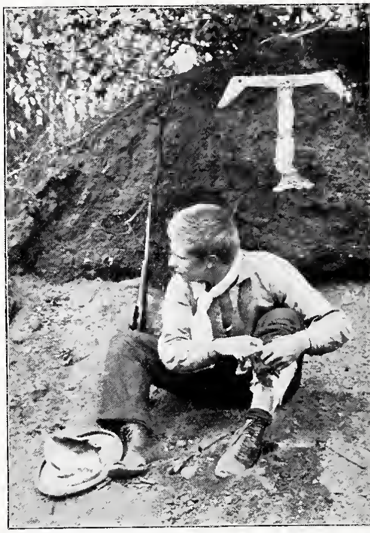
"WAITING THEIR TURN." By WALTER BURKE.

A ROW OF WILLOWS.

BY WILL D. CLARK.

THE NEW PHOTOGRAPHY.

BY GUSTINE L. HURD.



"I'LL FIX YOU FOR THAT." By W. H. WALKER.

THIS is a world of progress; this an age of change, and the last few years have been particularly prolific of change. Whatever proceeds from the brain or the hand of man must assume a new guise or the public turn indifferently away. The cry of up-to-date reverberates from one shore to the other, and anything that fails to conform to that requirement is relegated to the shelf. Medicine, Theology and Journalism are examples of new lines of thought and new methods of work. Painting has its periods of fashionable schools and photography has gone on from year to year with a variegated series of song and dance effects, some one of which is set forth from time to time as the style that is up-to-date. Now it is only light backgrounds with a delicate tracery of design that are to be used, and then black or heavy broken backgrounds are the *sine qua non.*

The Rembrandt style of lighting was at one time made a great feature by "Artistic Photographers," and contortions of figure simulating a tragic pose have been thought to suggest the handling of past-masters of the art of portraiture. It might seem to some uninstructed persons that the use of a light ground or a dark ground should be determined by the complexion and dressing of the sitter, with reference to the effect that was sought, independent of a decree of fashion; and that simple or theatrical poses would naturally be chosen according to the character and style of the subject in hand to some extent ; and that even the Rembrandt style of lighting was not suited to all faces.

Now amid all this tumult of belittling things a strong voice has been raised and a strong personality steps to the front (with Mr. Inglis' text book on lighting in his hand)—another John the Baptist crying in the wilderness, exclaiming, Ho, there ! my infinitely contemptible brothers ! come up out of the valley of humiliation and the slough of despond; cast off your masks of make-believe and set yourselves to earnest work ; come off your petty tricks, your ticket-schemes and gift-crayons, and learn to do work that has some dignity and value, and charge for your skill in doing it; have some little concern that the art you represent does not stand for nothing with well instructed people ; cease to make photographs from which all traces of likeness have disappeared under the retoucher's hand, and all characteristics of the sitter are lost by absurd and unnatural posing ; abandon your tricks of lighting and learn to light your subjects as the great masters of portraiture have done in all the past.

And this belated voice has caught the ears of some of the best men in the land, and already the photographic skies are brightening. The false standards that have been set up in the past, and so eagerly accepted by the rank and file of the public, have held many back from making a virile style of work. The money side of a question is always a strong one. But when it is found that with all the bargain pandering and Israelitish methods, photography is constantly sinking to lower depths as a business, that its products are less sought for, especially by the better class, it brings a pause, and reflective minds are beginning to cast about and inquire what the man in Chicago is saying. And they find that the man in Chicago is saying a good deal and very much to the point—that he has the courage of his convictions and is trying to infuse courage all along the line. And still further when it is seen that some who have resolutely broken away from the beprettied stuff they were making and working along artistic lines, are attracting a class who would not have photographs before, and are able to greatly advance their prices, the thing looks worth inquiring about.

It must be admitted, perhaps, that some who have become disciples of the new style of portraiture have slopped over in their enthusiasm and made work that will find little favor. Rigidity of line and ferocity of shadow is a treatment that may not be applied to all subjects ; neither does a besmudged image, sunk into the background, until nothing but the stronger lights of the face are visible constitute an example of the style of the old masters.

There is in every large community a small number of persons of dilettante proclivities who are enraptured with these bastard photographs. They have all along been engaged in decrying photography—proclaiming that it was machine-made stuff, and enough to make an artist shudder. But these violent and absurd things challenge their admiration, they are "so unphotographic," and Mr. So and So has had a narrow escape from being an artist. It seems to me that the photographer who allows himself to be allured into a continuance of this kind of production by this dulcet flattery, will not be able to contemplate his bank account in the near future with any great complacency. But this rank growth is quite apart from the great value that is given to work by the method of lighting recommended by Mr. Inglis. Perhaps it may be said that this can not be applied indiscriminately to all subjects without some modification. But those modifications readily suggest themselves, and it is undeniable that a great stride has been made in the right direction. The indications are strong that a simpler and purer style of portraiture is rapidly taking the place of the meretricious stuff which has constituted so large a portion of the work in the last few years. It is the old truth that applies everywhere—as we know more we do better.

By R. EICKEMEYER, Jr.

A FAN.

CLOUDS.

BY GEORGE A. SAWYER, U. S. N.

THE WATCH AT THE STILL.
By W. H. WALKER.

FEW persons can watch the gorgeous changes of color and form of a brilliant sunset, or the towering heights of summer cumulus clouds, without sometimes wishing it were possible to fix their fleeting beauties on paper or canvas.

While we have not yet succeeded in reproducing their colors, modern photography lends itself well in the preservation of the light and shade and form of these delicate objects.

I have been fortunate enough to spend some months of each summer on a hillside, from which there is an unobstructed view of the sky and I have gradually evolved a method of cloud photography which, while possessing no great novelty, affords me satisfaction and pleasure. It is simple and efficacious as it is easy.

I use Carbutt's 27 ortho. films and a Carbutt color screen. Carbutt's screens are made of two thin sheets of plate glass with a film of stained collodion or balsam between them. I take a piece of thin wood, cigar box will answer, and make a hood to fit my lens, and attach the glass screen thereto by pasting paper binding around the edges. Then, with a pasteboard cap fitting the screen, one is equipped.

I have also used the so-called ray filter, but it has no advantage over this form, which is perfectly adapted to the work in hand, with less bulk and at one quarter of the cost.

I use a lens of suitable focus to get on the plate what I wish, but for ordinary purpose, a lens of about 10½ inch focus.

My plate holders are always filled and everything ready for the opportune moment, which often is but a moment, as


By G. A. SAWYER.

the cloud forms, while their change seems but slow, are rarely at their best for more than a few minutes. I recall the circumstances of one of the most beautiful negatives I ever made. We had been having a violent thunderstorm and after it cleared off I went into the garden to inspect the damage done. Glancing toward the sky I saw in the dark curtain which hung over the heavens, a rift, and through it a superb pile of billowy clouds, lighted by the sun—the only bright thing in the whole sky full of leaden colors. I hurried in, got my traps, and while focusing, a ragged filament started out. I made the exposure, capped the lens, replaced the dark slide, and the beauty of the scene was gone.—It was being torn up literally into shreds, and the white strings were merging into the dark colors of the rest of the sky. I doubt if the beauty of the scene lasted more than five or six minutes, but I have it, and a sight of the print brings the whole scene back to my mind's eye with wonderful vividness, and with some of the pleasure afforded by the reality.

Having then a white cloud against a blue sky, point your lens to the desired object, focus, put on the color screen, insert stop F-40 or so, draw the slide, uncap the lens, and, if the sun is shining, and the scene well lighted, give it a full second exposure. If the cloud is moving or changing form rapidly a larger stop and less time will be necessary; but it will be found that the best results are obtained with a small stop and plenty of time, errors of exposure are of less importance.

On dull days, with a gray sky, the color screen is unnecessary. Its application is limited strictly to color objects, and it is safe to say that a white cloud against a pale blue sky

By GEO. A. SAWYER.

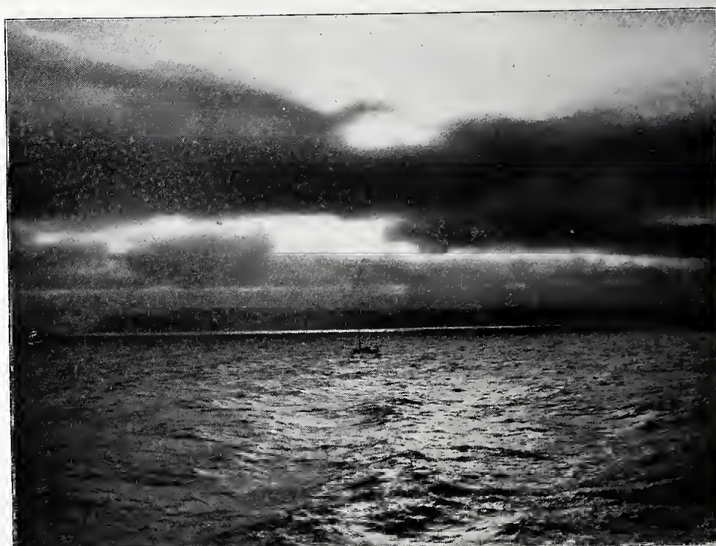
cannot be successfully photographed without its use. A word as to printing.

I have made or had made by experts in their special lines, prints in carbon, platinum, bromide, silver, and blue papers, and for these subjects I prefer the last by all odds.

I use a paper called French Satin, Jr., and make my prints from the perfectly fresh coated paper. In this condition the paper is the color of brass. After a while it gets a light slate color, changing with age to a darker hue. It is really only fit for use while it retains the brassy tint, but when it is just right the prints are of unsurpassed delicacy and beauty, and one gets a strong suggestion of nature in the blue of this particular brand, which is very like a mixture of cobalt and French blue, a color quite as near reality as one often sees in the attempted imitation of nature by a painter with brush and pigments.

The use of the color screen greatly prolongs the time of exposure. After focusing and stopping down you form your opinion as to the time and it is safe to give it from five to ten times longer if you use the screen. At the same time I have been able on exceptional occasions to make a shutter exposure with color screen and a stop of F-8 to F-14, and get a negative capable of development.

As it is unfortunately impossible to use blue paper for commercial book illustration, I send to the editor of this journal some blue prints illustrative of these remarks, and I beg him to give us the benefit of his judgment as to their beauty, and delicacy, with the hope that this simple and satisfactory process may be better appreciated and exhibited in its best results.



THE APPROACHING STORM. By OLIVER LIPPINCOTT

STUDY.

BY A. MORENO.

NEW ANTI-HALO PLATES.

BY LUMIÈRE FRÈRES.

By RENE LE BEGUE.

AMONG the parasitical phenomena occurring with the formation of the latent image in the sensitive layer of a photographic plate, the most injurious, for the obtainment of good proofs, incontestably is the partial or entire reflection on the posterior surface of the glass, of the light diffused by the sensitive layer in the most luminous parts of the image.

The best means recognized to this day for avoiding it, was indicated by Mr. the professor Cornu. It consisted to coat the back of the plate with a mixture of essences, having the same index as the glass, to which lamp-black is added.

This process is the only one giving complete results, but it has the inconvenience to oblige the operator to make one's self this kind of varnishing and to clean it before the development.

Coatings, more or less similar, have often been proposed, but if they are more convenient in manipulating, they are inferior as to the results obtained, for the substances employed as substratum of the absorbing color have often indices different from that of the glass.

Lastly, certain manufactures have placed in commerce plates prepared by a sub-coating containing either metallic oxides or haloid salts insensitive to light. It should be observed, however, that by using the oxides in question, it is necessary to have a very opaque sub-coating, which renders quite difficult to control the development, and that the efficiency of the insensitive haloid salts is only relative.

Long before the appearance in the market of the plates now in question, we have patented (July, 1891) the use of sub-coatings colored by means of a red or green coloring matter having for its object to stop the actinic radiations capable of impairing the sharpness of the image, and having the property to be discolored, after the development, by appropriate reagents.

Unfortunately, until now we could not succeed to prevent the diffusion of the color into the sensitive layer which was superposed, and from this resulted a notable diminution of sensitiveness.

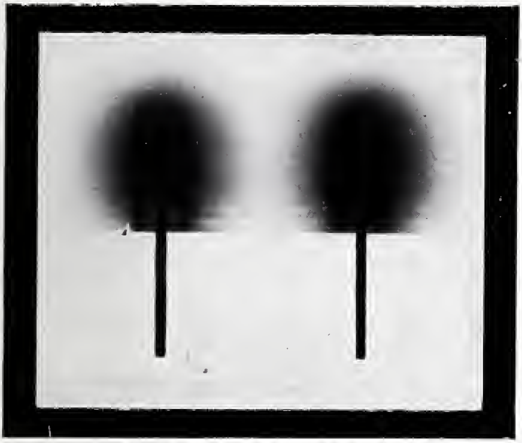


FIG. 1.

Lately we have turned this difficulty by preparing new insoluble coloring matters, and, therefore, we can now spread the emulsion upon a coating, previously colored ruby, without the sensitiveness of the preparation being in the least impaired. One understands that with such an arrangement the solution of the problem is solved, and the images we send with this communication are the evident proof of it.

The phototype Fig. 1 has been obtained by exposing under an opaque screen, having two parallel slits, a sensitive plate prepared with a ruby red sub-coating on one-half of its surface, and thus divided by a part protected A and one part not protected : one sees that the image of the slits is absolutely pure on the protected side, while on the other, that is the part not protected by the sub-coating, it is blurred by an intense veil.

The phototype Fig. 2 was obtained on a sensitive plate and represents two incandescent lamps placed in front of a black velvet screen, while the image formed on the protected part A is sharp, that which corresponds on the unprotected part is scarcely delineated, it being invaded by a very extended veil.

FIG. 2.

The development of these plates is done by a ruby light as easily as that of the ordinary plates, for one is exactly in the same conditions for examining the cliché as if a supplementary red glass had been placed in front of the dark-room lantern. It will also be recognized that the protection of the sensitive film resulting from the colored sub-coating is not to be disregarded and preserves the image from the veil often occurring during the development.

The ulterior washing off of the red color which would interfere with the printing of the positive phototype, is easily done by means of a bath of acetone and sulphite of soda which leaves only a faint trace of coloration having no influence on the time of exposure to light.

The special arrangements for the industrial fabrication of the plates will be soon complete and we will then place our anti-halo plates on the market.

LONE BEAR.

BY GERTRUDE KASEBIER.

THE "CHROMOGRAPHOSCOPE."

BY G. VIEUILLE.

THE direct photography in colors, that is, the reproduction of objects in their natural colors without employing anything else than the sensitive plate, is not yet generally practiced notwithstanding the splendid experiments of Professor Lippmann; on the contrary the indirect method is now employed in most photo-engraving establishments. As is known, the process permits of the reproduction of the photographed object in as many proofs as desired, by means of the three fundamental colors whose reactions are originated by the light itself.

By this method, devised a long time ago by Messrs. Cros and Ducos du Hauron, one must first make three negatives under certain conditions and through properly colored screens, then print the diapositives in color, which, by their superposition, give the sensation of the colors of the object. This double and delicate operation is extremely simplified by the use of the *Chromographoscope* of Ducos du Hauron. With this apparatus—which the firm of H. Mackenstein, of Paris, has constructed under the guidance of the inventor —the negatives and the adjustment of the plates used, are made in an automatic manner, so to say.

Fig. 1.

With the *Chromographoscope* Mr. Ducos du Hauron makes three monochromic images, one by the side of the other, *on the same sensitive plate*, the position being regulated beforehand, screens

—violet, green, red—correctly adjusted, act as the ray filter for each negative. To avoid the image appearing reversed, the apparatus is provided with a prism and the *Chromographoscope* must therefore be placed vertically, the lens turned towards the zenith, as shown in fig. 1, which represents Mr. Ducos du Hauron himself employing the apparatus.

When the negatives are obtained one by the side of the other, one can utilize them immediately for the operations actually in use for printing in three colors; but if one prefers to use the apparatus itself to obtain the colored representation of the objects photographed, this can also be done, all that is necessary is to make a diapositive of the triple original on a plate glass, and this proof being placed where the negative was before will give, by means of the colored screens and the mirrors of the *Chromographoscope*, the synthesis of the colors and the desired effect. In this case the lens is replaced by a kind of ocular, that is to say, a magnifying lens and it will be sufficient to hold the apparatus as seen in fig. 2.

Fig. 2.

ON NIAGARA RIVER. By Mrs. GEO. ADSIT.

THE PROGRESS OF PICTORIAL PHOTOGRAPHY IN THE UNITED STATES.

BY ALFRED STIEGLITZ.

LIZE FLEURON.
By PROF. STEBBINS.

IT HAS been openly questioned whether pictorial photography is making any progress in the United States.

In England, the home of the higher pictorial photography, with its Hintons, Annans, Davisons, Robinsons, Gales, etc., no startling advance or innovation has been made in the past year or two, although the general average of the pictures shown at the various exhibitions is said to have been unusually high, showing a general advancement chiefly amongst the minor lights, the leaders seemingly satisfied to hold their own.

In Continental Europe, on the other hand, enormous strides in the right direction have been made within the last few years. Vienna, with its influential club, full of enthusiastic workers like Henneberg, Bergheim, Watzek, Kuehn, Strakosch, and many others, has led the way in founding a new school of pictorial photography, tearing itself away from the accepted conventionalities and bringing out individualism wherever possible. The results obtained by these artists were exhibited in all the important exhibitions, of which there were many, and it was not long before their influence was made manifest, France and Germany falling into line, Paris producing its Demachy, Puyo, and LeBegue, and Hamburg its Hofmeisters, Einbeck, and others, whose work is so full of character and marked individuality.

The gum bichromate printing process did much to arouse this dormant talent, for by means of this method the artist has at last found an unlimited means of expression. A new field of possibilities has been opened to him, and the prospects for the future of pictorial photography have become much brighter with its advent.

Gum printing is bound to revolutionize pictorial photography. Here in the States, but little has been done in that line, practically nothing. Unfortunately there has been no international exhibition in which the Viennese and French pictures might have been exhibited, and which, beyond doubt, would have renewed our lagging interest in pictorial photography.

Thanks to the lack of such exhibitions and our otherwise rather short-sighted photographic club management, we have at last managed to take the rearmost position in the race for pictorial photography supremacy, the unenviable position disputed by France and Germany but two or three years ago. True, our work is occasionally favorably commented upon when exhibited at the various European salons, still the critics there claim, that as a rule our work lacks interest, vigor and individuality, and tends to prettiness and pettiness, lacking force, breadth, and strength. Strength is the backbone of art ; it is strength that lives.

Gum prints have been condemned as illegitimate by many who do not seem to understand how they are produced. The writer is a strict believer in the legitimate, for he has never retouched a negative or print, and yet he claims that gum printing may be as legitimate as printing with aristo. Local treatment is possible in either, that there should be more latitude in the former method in this particular is only to its credit.

We do not go so far as to advise pictorial photographers to discard all other methods of printing, for a beautiful picture in platinum or carbon remains a work of value, although it may not be quite so interesting as a photographic novelty to the photographer just at present.

Decided progress, on the other hand, has been made by a certain class of American professional portrait photographers in the last two years, so much so, that his work compares very favorably with that produced by the majority of his European colleagues.

WILLOW WARBLERS. By CHAS. REID.

NEGATIVE INTENSIFICATION.

BY HERBERT WATKIN.

By A. L. Princehorn.

SINCE I became a professional photographer many amateurs have brought me thin negatives which yielded washed out looking prints, and have asked me to intensify them. When I have returned these negatives the owners have invariably been surprised to see such a transformation in their otherwise almost worthless plates and generally wished to know how the intensification is brought about. My mode of procedure is as follows :—Well wash the negative to ensure the perfect elimination of hypo and afterwards place it in a bath of a saturated solution of bichloride of mercury. Examine it very carefully from time to time by holding it up to the light, and the moment it has gained the required density pour off the mercury and well wash under the tap for about half an hour. After this the negative is placed in a bath composed of

Liquid ammonia ·880	2 drachms
Water	10 ounces

until the deposit of silver and mercury is blackened. If all detail was showing, however faintly, in the original plate, an almost perfect negative will now be the result. After the ammonia bath it is necessary to wash for 10 minutes then place the plate on the rack to dry. The great secret of success in mercuric intensification is to leave the plate in the mercury solution only until it has obtained sufficient density, and not until thoroughly bleached. Many instructions on this subject advocate leaving the plate in the mercury until it is quite bleached, but this is misleading, as if a negative requiring slight intensification is treated thus, the resulting print will be of a hard chalky nature. Great care should be taken in seeing that the plate is well washed between the two baths, as if this is not done the negative will acquire a dirty brown tone.

SCREENS FOR THREE-COLOR WORK.

BY MAX LEVY.

Copyright, 1897, by Otto Sarony.
GRACE KIMBALL. By SARONY.

I KNOW of no technical subject which excites more active interest among processworkers at the present time than that relating to the properform and character of screens for three-color work. I have recently given this matter careful attention, and the results of my observations were summed up in an article written for the *Process Year Book* for 1898, and I feel that I can do no better than to reprint this article in full in the present ANNUAL.

"The theory upon which the half-tone process is based, as well as the general principles governing its practice, has been, for all practical purposes, completed with the publication of last year's ANNUAL, and the general principles deduced by Dr. Eder, Count Turati Dr. Aarland, and other investigators have met with general acceptance and application to current practice. There remains, of course, and always will remain, a number of specific points relating chiefly to practice, that are worthy of discussion.

The truly beautiful results that have been produced within the past year or so, by means of the three-color process, have given this branch of the work a material impulse, and this impulse has given rise to numerous queries regarding the proper character of screen for the work, its form and application.

It was originally believed that the single ruled screen was best adapted to the purpose of the three-color work, and its chief virtue consisted in the very considerable amount of variation from the normal that was permissible in the angle at which the various lines crossed one another, inasmuch as the whole series, when printed on one sheet of paper resulted in but six angles of 60 deg. each; its disadvantages, however, in imperfectly rendering delicate gradations and the middle tints, indicated from the very outset its final abandonment.

With the cross line screen applied to this purpose, the lines on the resulting impression form twelve angles of 30 deg. each, and these angles have now become so acute, that even a slight variation of two or three degrees may introduce a "pattern or moiré," but other advantages growing from its use far more than offset the increased requirement of accuracy in the angle. This requirement of increased accuracy seems at first a much more serious matter than it is in reality, its attainment requiring merely that the initial arrangements be adapted to the purpose in hand, and be of sufficient accuracy. The screen itself may be any good cross line screen with lines and spaces of about equal thickness; both rulings should have precisely the same spacing, and the lines cross each other at 90 deg. within a very small fraction of error.

It is generally desirable that one line of the screen should predominate in each block, and this result may be obtained in either of two ways: A, by means of a diaphragm aperture being made longer in the direction of one line than in that

By A. H. BLAKE.

SUNSET ON THE SAND ROAD.

of the other, or, b, by ruling one line of the screen somewhat heavier than the other. While I believe that the latter method may possess some slight advantages over the other, the former in turn possesses over the latter the great advantage of flexibility and practically absolute control of the degree of variation.

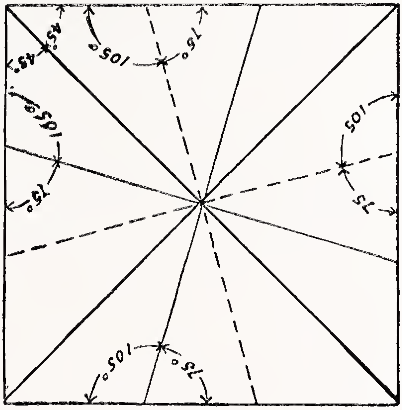


Fig. 1.

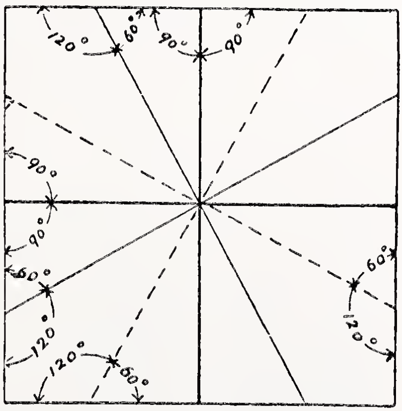


Fig. 2.

The question of the form to which the screen should be cut seems to have given rise to a greater variety of opinion on the part of users than any other point involved. This diversity of opinion of course arises from the use of different mechanical means of obtaining the various angles; if we take an ordinary list size screen, say 10 x 12 inches, we will be able, of course, to make a plate such as the screen was intended for, up to the full list size of the screen. When we attempt to make the two other plates, we find it necessary that the screen should be used at an angle of 30 deg. both right and left; we find that our screen will now make, at this angle, but little over 7 x 9 inches. If the screen had been 12 inches square, we should have been able to make a plate about 8 x 10 inches.

Various expedients have been resorted to, to overcome this decrease in the capacity of the screen; one of the most common is to have two screens of the maximum size desired, one may be ruled with the lines parallel with the two sides, in which case the complementary screen will be ruled with the lines at 60 deg. and 120 deg. to the sides, or the one may be ruled diagonally at 45 deg. to the sides, and its complementary at 75 deg. and 105 deg.

The diagrams will make the relations and conditions clear. Fig. 1 shows the symmetrical plate ruled at 45 deg. to the sides, and the complementary plate is shown in lighter lines, and the same screen in its reversed position is indicated by dotted lines. Fig. 2 shows the same things with the symmetrical plate ruled parallel with the sides.

In such a set of screens the plate ruled symmetrically to the two sides (either vertically and horizontally or diagonally), is used for one of the three blocks, while the screen which is ruled unsymmetrically to the sides is used for the remaining two, and as it requires to be reversed for the two different plates, it is advisable that the glass on both sides should be, as nearly as possible, of equal thickness.

Another method of using the screen in this work is to have one screen, and have it made either square, round, or hexagonal in form, and rotated in the holder for the successive plates. The method which I consider simplest is to have one screen of ample capacity, and have this screen remain stationary in the holder during the entire operation, with a separate arrangement for rotating the original to stops. In connection with such an arrangement, it is of course desirable that the plate holder shall be fitted to receive the plates at the various angles, in order to save the handling of large plates, and the waste of material which would be involved if the plates could not be used in the same position that the subject occupies on the ground-glass.

On the whole, however, I believe that the bulk of advantage is rather in favor of the use of two screens ruled as above indicated. The initial cost, as compared to the single square or round screen, varies considerably according to the size; in the largest sizes made the two screens together will cost a little more than a square or round screen of the same capacity, and from these sizes down, the difference is increasingly in favor of the two screens as against the one until the 7 x 9 inch size is reached, where the square or round screen costs about 50 per cent. more than the other two screens together.

Another element of economy in the use of two screens as compared to one is in the smaller size of all the apparatus employed, and the greater ease in handling the smaller screen.

In a very large number of cases the initial cost to a concern already engaged in half-tone work is very much in favor of the use of the two screens instead of one, for the reason that one of the screens already in use for current work may be employed to complement an additional screen ruled at a suitable angle."

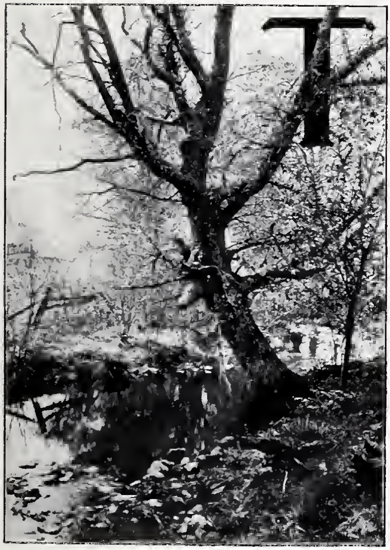
YOUNG AMERICA. By W. H. McQUILKIN.

THE YOUNG SHEIK.

BY F. H. DAY

PHOTOGRAPHING OPAQUE OBJECTS UNDER THE MICROSCOPE.

W. H. WALMSLEY.


By H. C. VOORHEES.

TWENTY-FIVE years ago or more, when Microscopical Societies abounded, working, or to speak more correctly, playing with the microscope was, in a comparatively great degree, as much of a popular fad as hand camera photography has grown to be in these later days. A limitless world of beauty and wonderment was revealed to thousands hitherto utterly ignorant of its existence, through the medium of these societies and their enthusiastic members. The numerous public soirees given by them were always crowded by throngs eager to view the "Oh my!" objects displayed beneath the magic tube. These were, of course, selected for some special feature of beauty or interest in form, structure, or color; requiring various methods of manipulation and lighting, to exhibit in the manner best adapted to the differing demands of each. For some, a polarizing attachment became necessary; others, ordinarily viewed as transparencies under plain transmitted light reflected from the mirror, were found to reveal unknown beauties of color and structure when illuminated by the paraboloid as on a jet black field. Others again, impervious to light from beneath, were only shown as opaque objects brightly lighted from above by means of condensers, silvered reflectors, or other special apparatus adapted to this purpose. Microscopes of any pretensions to completeness were liberally supplied with all forms of accessory apparatus, and the amateur had at his command, appliances for quickly producing effects of beauty quite unknown to the professional microscopist of the present day. In fact, the microscope *now* is a very simple instrument, made for research alone and not for play; it is an everyday tool, its mission is work only, the romance surrounding it has departed. This is a matter of regret, but in a utilitarian age, unavoidable. None the less, microscopists miss much of usefulness as well as beauty in their neglect of opaque objects, the exterior forms and markings of which are as frequently interesting as their minute anatomy and equally valuable in determining the complete structure of the subject.

In former days when illustrations were always made by freehand or camera lucida drawings, much very beautiful work in reproducing opaque objects as seen under the microscope was done. Two notable specimens are to be found in Richard Beck's large work on the microscope, than which it is probable none finer have ever been executed. One of these is a diatom—Arachnoidiscus—*in situ*, growing upon a frond of marine alga. This, if memory serves aright, was executed under a $\frac{1}{6}$th objective and is a marvellously perfect piece of work. The other is still more remarkable, a $\frac{1}{8}$th having been used in making the drawing, which is of a sliver from an ordinary pine-wood match. When the short focus of the lens is taken into consideration, the excellence of this drawing excites the liveliest admiration for the skill and patience exercised in its production.

Of late years the almost universal employment of photographic methods in reproductions, has greatly lessened the use of drawings for the purpose, but so far as my observation has extended, these have been exclusively of transparent objects. Indeed, I have never seen a photo-micrograph of an opaque object other than those made by myself, nor am I aware of a single article upon the subject having been published; yet, the process is quite as easy as that of handling transparent objects, with results equally satisfactory and valuable, the main consideration being their proper illumination. This is all-important. The lighting must be ample, but not too great. There must be no glare, every ray of

Fig. 1.—EGGS OF A MOTH, "THE DOT," + 21.

Fig. 2—GROUP OF POLYCISTINA, + 27.

light admitted to the tube should be an image-bearing one. Some subjects are best displayed by direct central illumination, avoiding shadows. This is best obtained by the use of a Lieberkühn attached to the objective, but may also be had with diffused daylight and without the intervention of a condenser, especially under low powers and light reflected from a northern sky. Many objects, however, are better shown if the light be thrown across their surfaces so as to cast slight shadows of their more prominent points should the surface be irregular. This can be effected through the medium of a silvered reflector or of a condensing lens on stand. But whatever method of illumination be employed, it is absolutely needful that it is even and free from all glare or confusion. The *source* of light is of less importance, though it seems quite certain that diffused daylight, as from a window with northern exposure is the best. Of artificial illuminants the most satisfactory in my experience is an acetylene gaslight, though a good coal oil lamp is not to be despised if nothing better be available. A moderately quick plate which will produce a negative of any required density is desirable, and for the developer I would advise every one to use that which he has found to be the most satisfactory in his usual photographic work. My preference is for my own well-known "graphol," but perhaps this is not altogether unusual. For printing purposes I think the preference must unquestionably be given to the "Velox" glossy paper, as it may be handled in subdued daylight, printed by gas or lamp light, gives rich black and white prints without toning, and is permanent. The prints from which the accompanying illustrations were made are on this admirable paper.

Of these illustrations it may be briefly stated that Nos. 1 and 4 were made with daylight from a western sky, condensed and thrown obliquely across their surfaces by means of an ordinary bulls-eye condenser on stand. No. 3 was made under condensed daylight from a silvered reflector, whilst No. 2 was exposed under simple diffused daylight. Moderately rapid plates were used with Nos. 1, and 2. With No. 1 a 2-inch objective and three minutes exposure. No. 2 was made with a 1½ inch and thirty seconds exposure. Both sub-

Fig. 3.—EMBRYO OYSTERS, + 32.

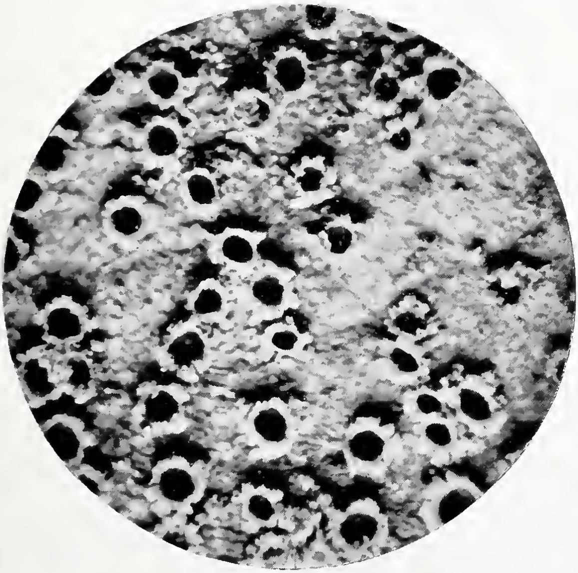
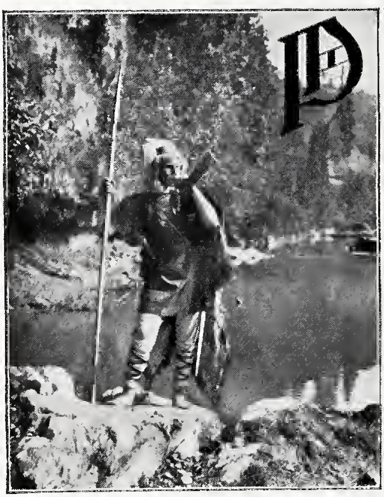


Fig. 4.—CLUSTER CUPS, + 30.

jects were white, but No. 2 was exceedingly brilliant, whilst No. 1, was quite dull and lusterless. Nos. 3 and 4 were made on very rapid plates, and both with 1½ inch objective. The former was a dull white in the specimen, and required but thirty seconds exposure. No. 4 was of deep yellow hue, and took ten minutes. With all, a projection ocular was used.

PASTING AND MOUNTING.

BY ARCH B. HORNE.



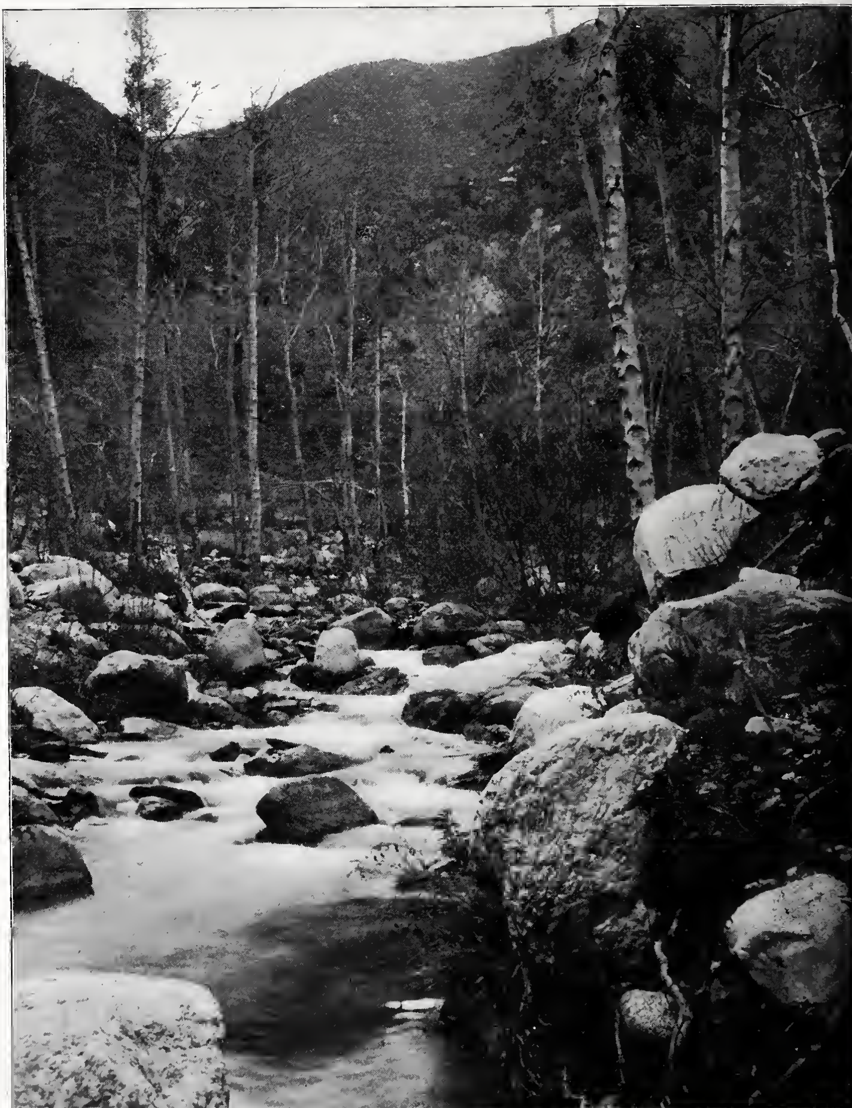
THE NORSEMAN By W. H. WALKER.

PROBABLY the part of our art requring the most dexterity and also the part most neglected by writers is pasting the print to its support. The way I have found best in my experience is as follows: The requisites are, a bristle brush, some paste such as Higgins', and some newspapers.

Take your print, after making sure that you have it trimmed to the best possible advantage from an artistic point of view, and lay it on your mount in the position you choose, then mark dots on the mount by the four corners of the print, with a pencil. Now take your print, lay it face down on a newspaper and hold it down hard with the ends of the fingers of the left hand, the fingers being spread apart. Then with the paste-brush put the paste on the center and work out, using a very small amount of paste. As you come to each finger it can be lifted while the others hold the print down. If you have occasion to remove your left hand, be sure to put your print on another piece of paper or you will probably get paste on the face of it. The back of your print being now covered with paste, take it by the two top corners, thumbs on the face, lay it on the mount to correspond with your pencil dots, and press down the middle of it with the ball of the hand. Then follow up the edges to see if it is on even; if it is press it all down with the hands, put a piece of tissue paper over it, so you can see if it moves, and roll it down with your roller. Never press down the edges until you see that it is on even, because if it needs shifting you can do so without leaving marks of paste on the card.

Now a word as to your print roller. The kinds on sale at the stock houses are too hard and often the roller is not even. The kind I use is a printer's roller, made of very soft material. It is not rubber but a gummy substance. It is so soft that it conforms to any shape and gives an even, elastic pressure all over the print. Try this and you will always use it.

STUDY. By ROBERT DEMACHY.



SAN ANTONIO CANYON.

BY OLIVER LIPPINCOTT.

THE NUDE IN PHOTOGRAPHIC ART.

BY H. EDWARDS-FICKEN.

By ANDREW ERMINE, JR.

The evening dews are softly falling now.
The frogs are croaking by the water's brim ;
The pensive milkmaid goes to milk the cow,
While all the scene is wrapped in shadows dim.

THE nude in photographic art is a very different thing from the nude in art, the one being a literal reproduction of the human form more or less undraped, and the other the idealized figure removed from meretricious consideration by the absence of features which cannot evade the lens.

It seems to have escaped those who have written in defense of photographing the nude on the lines of its right to an equality with the painter's art, that this lack of idealization on the part of the photographer is the one weak spot in their argument, and a weakness that cannot be overcome.

The painter approaches his painting of a nude with the training of his early years in the life classes of the art schools that has deadened all sensibility to the nude model as a living subject ; that sees only in the model a mere tool, a help to correct line, an aid to perfect drawing of the anatomy, a mere lay figure to be clothed with the artist's inspiration, and this lay-figure he idealizes in such degree that the sense of nudity is lost in the sentiment of his work.

The layman feels this so instinctively that he does not stop to analyze his acceptance of such nude painting, his entire mind being given only to the enjoyment of its contemplation, and it may be unhesitatingly accepted that the reverent painting—not using the word in a religious sense at all—of the nude will excite only reverent admiration.

Can this be equally accepted with the photograph of the nude? Here is but the literal transcription of the model, one recognizes the human presence at once, and only one train of thought is therefore evoked. If the model is female and well-proportioned, she is considered, but not the composition in which she figures or forms the subject; if male—that it will hardly do to let females see it, so present is the feeling of the intimate relation and reduction of the photograph to the plain unsentimental reality of life.

The amateur who attempts to photograph the nude has never had any real art training, and if his photographs are not mere "living pictures" they are on an equally inartistic plane, being impossible attempts with amateur models to reproduce idyllic scenes of another age in which the modern makeshifts play the most absurd parts.

The painter when he uses a camera on a nude model uses it so frankly that he locks away his negatives and prints from his lay friends. He recognizes the use and limitations of the camera exactly as the surgeon does his knives. It is useless to argue in this connection *honi soit qui mal y pense.* When serving on one of the State Art Committees of the Chicago Exposition a letter was received from the President of some Women's Christian Temperance Union somewhere in Pennsylvania, asking—nay, demanding—that no nude statuary be allowed in the Art Gallery!

There is a great difference between pruriency and virtue, but there is also to be considered the great amount of absolute ignorance in the world that belongs neither to the one nor the other, that accepts certain views and is alarmed, without being able to explain why, when accepted views are disturbed. To this very large class belong those who may not be shocked by the exhibition of the nude, but deem it unnecessary. And the question has been asked and argued in the highest realms of art if the nude *is* necessary. That it could be asked at all would seem to positively decide that it is quite unnecessary in photographic work.

From what we know of the lives of the painters whose names are distinctly associated with the painting of the nude, they lived most irreproachably, the very purity of their work seeming to demand their entire devotion to it in a pure manner of life. There is nothing so beautiful as the perfect human form, and the sole sensation awakened in the mind in studying its pictured beauty is one of pure aesthetic enjoyment. The perfect model, however, is hard to find in the modern environment, and it is but the painter's idealization we enjoy. The average model, indeed, of the life classes is anything but beautiful, and the usual studies made from such, drawn and painted with the most literal realism of every human imperfection excites only aversion in the layman. The photograph gets down to just this level, it pictures only the living model as a living model, posing nakedly.

There has been exposed for sale for same time past in the cheap "art" stores a series of nude or semi-nude photographs of female subjects, in which an attempt has been made with stucco columns and seats and other imitative accessories of the classic period to give these pictures a pseudo-art character which has deceived no one but as appeals to meretricious fancy. They convey the moral.

Sarony, shortly before his death, published a series of studies from the nude founded upon well-known masterpieces, but although he produced these by photographic processes, they were not direct photographs from the nude. Sarony was a thorough man of the world as well as an accomplished artist and skilful photographer, and understood the temper and attitude of the world towards the suggestive in art. He made his photograph from the living model simply as a foundation for his black and white drawing, worked this up to the composition he was following, idealized the figure beyond all suggestion, and then photographed his finished picture for the reproductive process of publication.

What Sarony would not dare the rest of the photographic world had better leave alone, for he was a man of fine artistic instinct with its usual accompaniment of a very pure mind; devoted to drawing from the nude, yet he never subverted his camera to photographing the nude for public exhibition in his perfect understanding of the lack of fine feeling or sentiment in the presence of rude literalism.

HARMONIOUS LIGHTING.

BY R. W. HARRISON.

"MORRIS LANE." By M. BETTS.

THE desire of the public for more artistic lightings has brought largely into vogue the single slant light, and invention has made available the flashlight. By both these methods more artistic lightings are possible than with the old side and top-light system with multiple screens and reflectors. The latter were necessary some years ago to produce the conventional photograph of the time with a reasonably short exposure, but there is a demand for some thing better and I wish to call attention to the fact that a higher class of results is available where reflecting screens as such are not used.

Artists who paint are very careful to prevent reflections by painting or draping their studio walls a suitable non-reflecting neutral color, while some photographers go to the other extreme of surrounding the sitter with reflecting surfaces.

My idea is that as beauty is found in both extremes and everywhere between those extremes, it ought to be portrayed as found.

Beautiful lightings are found in rooms where the walls are white or nearly so, while admirable effects of light and shade are discovered in apartments with dark draperies and sombre surroundings, and out of doors all sorts and shades of reflection and non-reflection disclose beauty natural and harmonious.

It is only in a photo studio picture that we find a heavy black background while the lighting on the figure shows reflecting surfaces everywhere. It is in the painter's studio picture we frequently find a light effect of background without any corresponding influence of surroundings upon the face and figure.

By LINDENMUTH.

LOVE LETTER.

These things are not right; the beautiful is always harmonious. If the background is light the fair presumption is that the adjacent reflecting surfaces also were light and a soft effect of light is required for harmony; while if the background is dark similar surroundings are to be expected, and in some places shadows will blend into each other even to the obscuration of lines and detail, but an harmonious effect of light and shade results.

The great struggle in photography aside from pot-boiling is to attain to the natural and harmonious, the conventional always being the stumbling block in the path. I believe that the flashlight carefully handled in the homes and not in studios to make possible the attainment of a much more artistic order of lighting, provided reflectors are not used.

THE DRUDGERY OF DEVELOPMENT AND HOW TO AVOID IT.

BY JOHN NICOL.

By GEO. C. MEEKER.

THOSE who employ plates of 8½ x 6½ or upwards can be easily convinced that half a dozen are enough for any day's work, but to the devotee of the hand camera, and especially that of the magazine variety, such teaching falls on deaf ears. Both observation and experience show that the desire to snap at everything that is either curious or interesting is simply irresistible, and that, altogether irrespective of its pictorial possibilities. The number of his exposures is only limited by the capacity of his magazine, and not even by that where there is a possibility of recharging it.

But Nemesis awaits him when the time for development comes. To develop a few plates, especially when the subjects have been carefully selected, and everything conducive to the picturesque has been carefully studied, is one of the greatest pleasures connected with photography; but to tackle several dozens, mostly of too short exposures, and each seemingly of less interest than its predecessors, is not only a weariness of the flesh, but a work that even the most enthusiastic cannot have the patience necessary to do well.

But by tank development the toil may be changed to a pleasure and exposures given a chance to yield pictures. Snap shots are more frequently under than over exposed, and it is generally admitted that under exposures are better developed by weak than by strong solutions.

Six grains of Ortol (I say Ortol because it is at present my favorite, but any of the modern developers may be substituted) in two ounces of water will develop in succession at least six 4 x 5 plates, and it has been proved beyond a peradventure that, dissolved in twenty ounces, it would develop them as well if given sufficient time.

DEVELOPING TANK.

Acting on that principle, my eighteen-plate magazine hand camera, formerly a source of dread, is a constant and loved companion; as the eighteen, or even two dozen, are developed, fixed and washed with more certainty and less trouble than was one plate by the older method.

The tank I employ and find to answer admirably is the twelve groove rubber fixing box shown in the above cut, and which may be found in most of the stock houses; needing only the addition of a card board cover deep enough to be perfectly light-tight. The grooves are wide enough to take each, two plates back to back, and they are kept from the bottom and contact with any deposit that may be formed by a bar across on which they rest.

To cover the twelve or twenty-four plates about fifty ounces is required, and for the last six months I have made it up as follows:

Ortol	30 grains
Potass. Metabisulphite	15 grains
Sodium Sulphite (xls)	200 grains
Sodium Carbonate (xls)	200 grains
Potassium Bromide	5 grains
Water	60 ounces

Development may be started at night and found complete and satisfactory in the morning, or in the morning before going to business and finished at night. I do not remove the plates from the tank till they are fixed, washed, and ready for the drying rack.

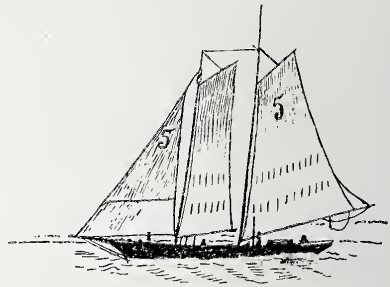
MAKING LINE DRAWINGS FROM PHOTOGRAPHS.

BY VAL. STARNES.

By Val. Starnes.

IN THESE days of steadily growing newspaper illustration, any simple method of quickly and accurately making a pen and ink drawing from a photograph should prove at least interesting, if not actually beneficial, to most of your readers.

Lay a piece of loosely woven tissue paper, such as you will find between the pages of cheap drawing books,—the glazed or waxed varieties used by photographers are *not* suited to the purpose—upon the *back* of the photograph to be copied and place both against a strongly lighted window pane; (if the drawing is to be elaborate, requiring a great deal of detail, the tissue can be first pasted slightly at the corners to the photograph, and the latter pasted to the pane); then with an ordinary soft pencil (Faber No. 1 or B drawing) make a careful copy of just what you want reproduced; having done this, lay the tissue paper, pencilled side down, upon your clean sheet of drawing paper and go over the lines you



have made with any available stylus, a tolerably hard lead pencil finely sharpened will do excellently; on removing the tissue you will find a correct drawing of the photograph which only needs to be "inked in" with a pen. Of course you can put in as little or as much detail or shading as you please.

Where many copies may be wanted in the future from the same original, the tissue paper can be put away to be used again and again. Moreover, the above method is valuable in making original free-hand drawings. The difference between the draughtsmanship of an amateur and an artist, is that the latter never wastes a line, but makes every stroke with boldness and confidence. With the tissue paper to help, however, an inexperienced draughtsman can draw half a dozen legs and a dozen arms, we will say, until he gets his figure to suit him; when he

is satisfied, by simply making those lines that he considers correct a little heavier than the rest, so that the result has that bold, dashing, indescribable look that is a distinguishing feature of even outline drawings by master hands.

CHILD STUDY.

BY MORRISON.

CHILD PORTRAITURE.

BY E. B. CORE.

By E. B. CORE.

TO THOSE of my readers who are parents, I need make no argument supporting the failure of photography to at all times render truly the face of the little ones. The father sees and studies those little points that give evidence of future character, and he is led to speculate on the position likely to be occupied in maturer years. The mother, oftimes more hopeful, takes an assured view, and, true to her convictions, employs all means in her power to bring a realization of her prophecy. So, too, they often see and interpret the character differently, and as a portrait is, or should be, a rendition of character as well as features, see the products of your studio with very different eyes. If you have ever photographed your own baby, sweetheart, or wife, you know that satisfaction came not always with what you feel—judging by the standard which you measure work for others—should be satisfactory, even gratifying, to your customers. There is a little subtle something which cannot be expressed, nor easily seen and understood. The good mother, filled with that love which

By E. B. CORE.

CHILD STUDY.

BY E. B. CORE.

By E. B. CORE.

only a mother can have, desires the representation seen through those eyes of love, and surely she is entitled to have it. She has followed those toddling foot-steps by day, and kissed those rosy cheeks into slumber at night, not strange that she has seen many, many things, cute, bright, and beautiful, which to her fond heart are possessed by few, if any other. So we should not be too uncharitable when she fails to find her ideal among the many efforts you have made and submitted. She need not tell you what the trouble is, the chances are she can not.

One of the best miniature painters in New York tells his clients that his pictures have previously been successes, the next one he makes may be a rank failure, "but if it is, you won't get it." I have heard of another who is wont to "give up" on failure, with a request to try again in six months, hoping that inspiration, chance, or a fresh start will give him success, which it likely will if he cultivates a cheerful disposition.

So the little one who comes to sit over should be received as an old friend,

By E. B. CORE.

CHILD STUDY.

BY E. B. CORE.

and loved one, and right here I want to say that the man or woman who does not love children has no business trying to photograph them. The anxious mother, knowing how much the pictures usually obtained lack the most desirable quality, and being impressed, mayhap, by previous experiences, drags the little one to the studio, loaded with a code of rules and regulations, fit only to govern Spanish soldiers, and, very like them, fears the consequences of falling into the hands of the enemy. Natural care-free expression can only come from natural care-free mind and muscle. The least display of ill-humor will change a hitherto uncertainty into a certainty of failure, and really is a trying ordeal. Forbearance is a virtue that all conscientious workers should cultivate, and is required by all who wish to succeed in their undertakings. What has seemed a task to the mother becomes a pleasure, and she leaves with a feeling of contentment which is shared by the photographer.

By E. B. CORE.

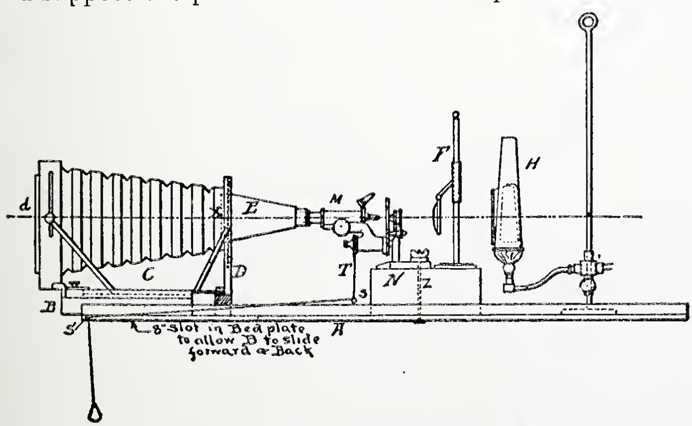
SOME PHOTOMICROGRAPHIC HINTS.

BY GEORGE D. FIRMIN.

The making of Photomicrographs is an exceedingly interesting and instructive occupation for winter evenings. It is not essential that we be eminent scientists to enjoy it. The mere making of the micrograph is pleasure even if one does not thoroughly understand his microscopic object. If it is necessary to make the apparatus, so much more pleasure and profit. To the "non-microscopist" here is where the instruction comes in. In order to photograph it the operator must thoroughly examine the object. This leads to investigation as to "what it is," and the correlation of parts; the preparation of objects for the microscope, cutting, staining, imbedding, etc., are studied, and soon we find ourselves wandering in fields biological.

Photomicrographic machinery is expensive and usually presupposes the possession of a microseope. I have had a good deal of pleasure in rigging up an exceedingly eheap home-made appliance which, with a little care, will do the work very well. For the benefit of readers of the Annual who may be interested I will describe it, with the suggestion that it may easily be adapted for lantern-slide making.

I suppose the possession of a microscope and a camera.



If you don't possess either. 1st. Buy a *camera*. 2d. Borrow a microscope. 3d. (If you like it well enough) *buy* a microscope, they may be had for little cost. As I had an 8x10 camera I used it. A light-tight box fitted with a back to receive plate holder would do as well. In the latter case a *hinged* back is much better than one spring actuated, as there is less liability to change the focus when using high-power objectives. The cut almost explains itself.

"A" is the bed-plate consisting of a pine board three feet six inches long by nine inches wide, with side strips one inch high tacked on to serve as guides. In the center of the bed is a row of holes one quarter inch in diameter and two and one half inches apart. These are to receive the clamping pin "z" (a small carriage bolt) to hold the microscope steady. "B" is a sliding piece nine inches by twelve, to which is screwed the camera body "C." The front "D" is fixed in position by a clamp passing through one of the holes in the bed, so the back "d" is used to focus. "E" is a cone of cardboard lined with black paper, and having a piece of mailing tube lined with felt or velvet, fixed in its small end to fit over the microscope tube. The microscope "M" is clamped to a wooden block "N" to raise it to the proper height to center with the camera. That the microscope may always be in line with the rest of the apparatus, it is well to tack strips of wood to the block "N" to serve as guides. The condenser "F" is placed on the same block or may stand to one side provided the lens centers accurately with the microscope. If the latter is provided with a sub-stage condenser, "F" is not necessary.

The illumination is by a Welsbach light, covered with a sheet iron chimney. This chimney "H" has a narrow vertical slit for the passage of the light. When monochromatic light is used this slit is covered with a sheet of cobalt blue glass, three inches by one inch, working in grooves. For white light this blue glass is replaced by an ordinary microscope slide. A tin-smith made the chimney for ten cents; a cheap job.

The apparatus must be accurately centered or distortion will result. The microscope is focused by a thread "T" passing around the fine adjustment head, through the eye-lets "S" and "S'", and terminating in weights conveniently placed near the hand. By this means high power objectives may be focused with comparative ease. Any size plate may be used, but 4x5 is very convenient.

A color screen will often be of service. In fact, with some stains it is a necessity. I have used an ordinary Carbutt screen set in slides "X" in the camera front. A Bausch & Lomb bichromate of potash cell on a stand between the light and the microscope would possibly be more convenient, besides the possibility of varying the density of the screen to suit the object.

With high power objectives as $1\frac{1}{2}''$ oil immersion, long exposures are necessary. Care must then be taken not to jar the outfit, as the slightest touch will throw it out of focus. A cover glass $\frac{7}{8}''$ dia., cemented to the center of ground glass is a help in fine focusing. It is seldom necessary to use the microscope eyepiece. The objective alone gives better definition.

For lantern slides replace microscope by a frame to hold negatives ; iron chimney by a plain glass one. Insert ground glass between light and negative, and use in camera $3\frac{1}{4}$x$4''$ kits.

A STREET SCENE IN SPALATO. By JOHN BUSHBY.

THE COMPOSER AND THE MUSICIAN, No. 1. By E. LEE FERGUSON.

THE COMPOSER AND THE MUSICIAN, No. 2. By E. LEE FERGUSON.

THE COMPOSER AND THE MUSICIAN, No. 3. By E. LEE FERGUSON.

THE COMPOSER AND THE MUSICIAN, No. 4. By E. LEE FERGUSON.

THE RETICULATION OF GELATINE FILMS.

BY JULIUS F. SACHSE.

By HAROLD BAKER.

IN TROPICAL climates and during such hot and torrid spells as we are occasionally subjected to in this latitude during July and August, and the humidity makes life almost unbearable, it frequently happens that the photographer is brought to his wit's end, how to develop, fix, and wash his negative, and keep the film upon the glass. The professional, whose dark room is adjacent to his studio, usually makes use of quantities of ice, and succeeds fairly well.

Occasions, however, arise where ice cannot be obtained or its use would be objectionable. For such cases various remedies and formulæ have been suggested, to prevent frilling, sloughing, or the disintegration of the film.

The bases of most of these formulæ rest upon the tannic action of alum, or the anti-septic and preservative properties of formaldehyde. Praises of the latter's action on gelatine films, by making them absolutely insoluble, have been repeatedly sounded at home and abroad.

Now formaldehyde as applied to photography is a good servant if properly used, but it requires the greatest judgment and care, or it will ruin, in an instant, what would otherwise have been a good crisp negative.

The writer has been in the habit of using formaldehyde solutions during excessive hot spells, for several years past, with almost universal success.

Two instances of reticulation, however, are recalled, the first was when that agent was first mentioned for photographic purposes. A ten per cent. solution was tried, with

By ROBERT DEMACHY.

TRISTESSE.

the result that all plates were beautifully reticulated. By adding double the quantity of water the difficulty was over-overcome.

Since then the writer has used a modified tanning solution with excellent results, viz:

A

Water	8 ounces
Formaldehyde, 40 per cent solution	½ ounce

B

Water	8 ounces
Solution chrome alum, 10 per cent	1 ounce

For use pour B into A; stir until thoroughly mixed.

The first great secret in developing dry plates during a hot and humid spell, is to have all solutions perfectly fresh and of even temperature, say that of the running water used for final washing. At the same time reduce the amount of alkali in the developer to a minimum.

When the plate is sufficiently developed, rinse carefully and place in above tanning bath, let it remain from three to five minutes, then remove to a fresh hypo bath without rinsing.

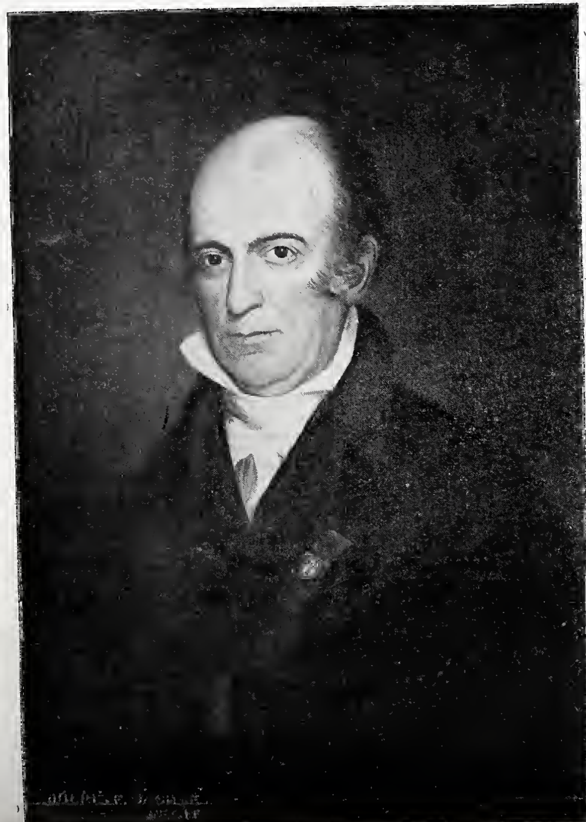
The same proportion of chrome alum solution should be added to the hypo fixing bath. It keeps the hypo clearer.

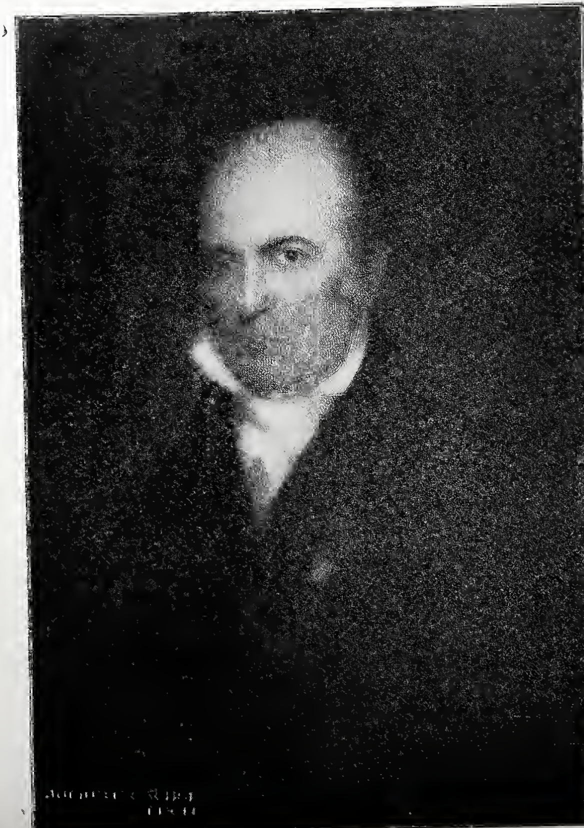
When thoroughly fixed, the plate may be washed with impunity, without danger of frilling. A perfect negative should be the result.

My second instance of reticulation occurred with the use of above given formulæ. The solution was two or three days old, and had evidently evaporated, and thus become more or less concentrated.

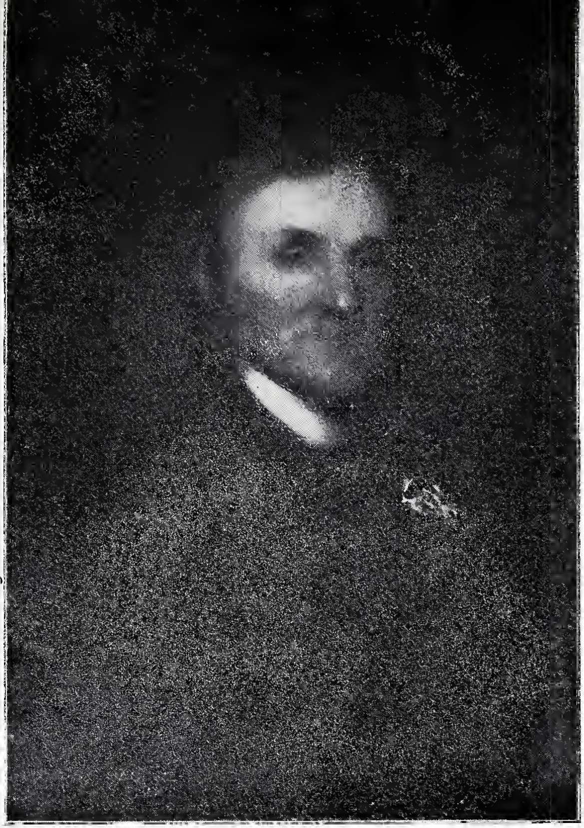
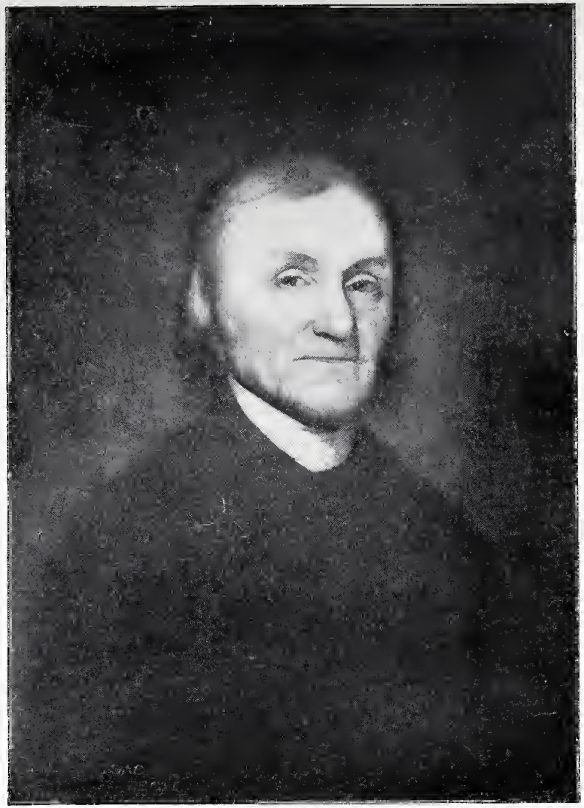
Comparative illustrations are here presented showing the necessity for fresh solutions under above trying circumstances.

The originals of our negatives were old oil paintings, and were photographed in the dim light of a private house. Two exposures were made of each subject. It was imperative that the plates be developed at once. It was midday, with a temperature of 98 deg. F. in the shade. In the dark room it marked 110 deg. F.





COMPARATIVE ILLUSTRATIONS SHOWING RETICULATION.

COMPARATIVE ILLUSTRATIONS SHOWING RETICULATION.

The first two plates were developed and placed in the old tanning bath. After three minutes one plate was completely reticulated, the other was even worse, the whole film showing signs of sloughing from the plate. As soon as this was apparent, all solutions were at once poured into the sink and fresh ones were mixed up. Two other plates exposed at same time were subjected to precisely the same treatment as the first two. There was no trouble, and as will be seen, considering the originals, with satisfactory results.

This experience shows how necessary it is to use great care when a formaldehyde solution is used. At the same time in the writer's opinion, under the circumstances it would have been almost an impossibility to obtain the results presented unless the tanning solution, or quantities of ice, were used.

Another point arises in connection with this subject of reticulation, that is: the possibility of utilizing this peculiar property of formaldehyde in the photo-mechanical reproduction process. Perhaps it may in the course of time put us upon the track of that chemical grain, which has been so earnestly sought after.

HARVESTING. By GEO. W. NORRIS.

PORTRAIT.

BY ALFRED STIEGLITZ

A PICTURE AND A PHOTOGRAPH.

BY E. LEE FERGUSON.

STUDY OF A CHILD. By E. LEE FERGUSON.

LAST SUMMER one of our leading painters was working on a canvas in a little glen near Washington. He painted his picture entirely on the spot, and, while watching him at work, it occurred to me that a comparison of the scene as it actually was and as the painter saw it might be instructive, or at least interesting. I therefore made a photograph from nature, placing the camera where he sat in painting the picture, and subsequently photographed his painting. The two are reproduced herewith. The painting loses in the reproduction, as its beauty depends so much on the coloring. However, the actualities which form the basis of some of the idealities of the painter may be readily identified. It will be observed that the artist has ignored the wealth of petty detail; has rearranged trees and rocks; has left out some prominent trees, a "rustic" bridge and a glimpse of a stone building; and has produced a simple, harmonious and pleasing picture. My friend labors under the impression that he painted the glen as it was—though he admits leaving out the bridge—and so artists can generally see the beauty of spots where the lens sees only a confusion of detail.

GLEN ECHO, PHOTOGRAPH FROM PAINTING. By M. W.

GLEN ECHO, PHOTOGRAPH FROM NATURE. By E. LEE FERGUSON.

FLOWERS.

BY L. H. FRIEDBURG.

Flower in the crannied wall,
I pluck you out of the crannies;—
Hold you here, root and all in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is.—TENNYSON.

By L. H. FRIEDBURG.

THAT is the poet-philosopher's way to look at a flower. There are, however, difficulties of entirely different nature encountered, when we begin to reproduce a flower, albeit with the skilled hand of the painter or with the skill of different kind, peculiar to the artist-photographer.

Color-photography, though no longer a dream, but a reality, is still in its infancy, and the pictures taken by the Lippmann Process, infinitely delicate as their hues may be, have this disadvantage, that you must look at them under a certain angle in order to perceive them.

The average mortal has for the time being quite enough to do, when he attempts to reproduce black on white, or in sepia tones, the true color-values of a flower, a leaf or a bouquet. He has at his disposal ray-filters, orthochromatic and panchromatic dry-plates, and he has learned how to manage them.

We are no longer displeased, when reproducing a beautiful light-red rose, with green leaves, to obtain a black and white picture in which the flower appears black as night and the leaves less so. This may be said with still greater emphasis in regard to a dark purple hyacinth and its lighter green leaves, where the effect will be reversed.

But still, if all the modern improvements which science (optics as well as chemistry) has given into our hands are successfully mastered, there is still remaining a something, which cannot so easily be learned if the nature of the artist does not predispose him for the task. We mean taste. There are innumerable excellent photographs of flowers existing, which still lack that which would make the picture a joy to behold. Then there are plants which seemingly object to being reproduced, for their branches and flowers are entangled to such a degree, that none of them would appear to advantage on the picture. In such cases, the artist is compelled to coax nature to his purpose. The most delicate touch of his hands will bend a leaf backwards, a flower forwards, will separate the thick leaves from each other, so as to allow interstices to show the white or gray background between them.

By L. H. FREIDBURG.

The vessel in which cut flowers are inserted is also of some importance as far as the final effect is concerned. Some flowers will appear best, if thrown upon a suitable piece of velvet or plush, upon a table or upon the floor, and these photographed from above, the camera being fixed in a vertical condition.

In photographing bouquets, attention has to be paid to the arrangement of all the flowers in as nearly a plane as possible. For small pictures this is not so imperative, because they are taken from a greater distance, but if we want to crowd twenty chrysanthemums on a plate 6½ by 8½ we must press the bouquet with our hands to a flat form, which does not show off at all in the vase, but which will give the desired effect on paper.

Flowers are whimsical like their fairer sisters, and though they do not complain about their pictures not being anyways near to their real appearance, the artist himself, after hours of labor, discovers this at once, and in looking back at the original, he imagines he sees a hue of contempt surrounding his bouquet.

Let us hope that no such fairy-spook has been at work in the production of the accompanying pictures, which have been picked out from a greater number, children of my hours of leisure.

By L. H. FRIEDBURG.

PRIMAVERA.

BY ROBERT DEMACHY.

CLOUDLAND.

BY H. A. BEASLEY.

By H. A. BEASLEY.

CLOUDS exercise a marked influence over pictures in which they are at all prominent; they either make or destroy its artistic qualities. It is therefore absolutely necessary that photographers should have some idea of the proper positions which the various forms of clouds occupy so that Nature's arrangement of the fleecy bodies will not be disturbed by a mistake of the artist.

With an earnest desire to save fellow amateurs the trouble of going into the matter deeply I venture to give a few definitions which I have found useful in fixing the relative positions and forms of cloud permanently in my mind. This slight knowledge has led me to take an increased interest in Nature, and certainly has prevented my making serious blunders.

Fig. 1.

Clouds are divided into three principal classes; Cirrus, Cumulus and Stratus.

Cirrus. (Fig. 1) are the white feathery patches in the blue sky and are the highest of all clouds.

Cumulus. (Fig. 2) are the great dome-shaped clouds (generally having horizontal bases) and are most prominent in the forenoon.

Stratus. (Fig. 3) are the low horizontal layers of cloud, of an even thickness throughout, noticeable in the early morning and late in the evening.

From combinations of the above principal classes are formed *cirro-cumulus* (Fig. 4) or "a mackerel sky" used so frequently in pictorial photography; *cumulo-stratus* or rain-threatening clouds and *nimbus* or rain cloud proper.

Fig. 2.

Combining clouds with suitable foregounds has been treated so often by "past masters" of the art that nothing need be said in this connection. The above facts will of course be stale to the more advanced photographers, but as beginners are

Fig. 3.

always entering the ranks some provision must be made for supplying them with useful information, or at least with such data as will prevent their making "discords" of intended "harmonies."

Fig. 4.

CUTTING THE HAY. By LLEWELYN MORGAN.

GENERALITIES ON VELOX PAPER.

BY DR. LEO BAEKELAND.


OUR BABY. By FRANK A. GILMORE.

ETHELBERT HENRY, C. E., recently published a very interesting article in which he wrote the following:

"Amateurs photographers have long been waiting for a printing process that can be worked in the evening without the necessity of shutting one's self off in a dark room for hours at a stretch; at least, that is the conclusion at which I have arrived after chatting on the subject with many of that influential class. Now when Velox first made its appearance on the English market it struck me as likely to fill the long felt want, and I decided to give it a trial. Some time passed and I might have forgotten all about it had not a naval officer called my attention to the charm of the process. I have since tried it most thoroughly, and must admit that I have never met with any printing process so easily mastered, so rapidly performed, or so pleasing in the results."

This may tend to change the opinion of any one who still thinks that the Velox process is a difficult one.

It is a fact, however, that I have met many people who express quite different opinions on this subject. Several of them who had most trouble with it, were taking all kinds of unnecessary precautions, in the meantime neglecting essential conditions. For instance, some of them were very particular to handle Velox paper only by ruby light and with the same care as if it were a dry plate or a very sensitive bromide paper. This is rather ridiculous because one of the main advantages of Velox is that it can be printed and developed by full gaslight.

Others were very particular to use none but the very purest chemicals, which they purchased at a high price, which they weighed off very carefully, and then instead of following the descriptive circular they made the developer so dilute that nothing but brown or greenish blacks could be obtained. Others made the developer strong but let it stand in open bottles; then because the developer worked all right with their plates they judged that it ought to do for Velox; but, when they proceeded to develop their prints they found to their disappointment that the blacks were either greenish or brownish. If they had used average chemicals and not spent so much trouble in weighing same carefully, if they had used the developer in strong and fresh condition, they would not have had the slightest difficulty.

Sometimes, too, when compounding their developer very carefully they left out the bromide of potassium or did not add enough of it, and the result was impure whites. Then others after carefully developing and obtaining good prints spoil them hopelessly by throwing them into the hypo bath in such a way that the prints are not entirely immersed, which produces large brown or purple stains in those places where the hypo has no free access.

It is astonishing to see how often people succeed in complicating a simple process in finding out new ways how not to do things right. And still many thousands of amateurs and professional photographers who are daily using Velox know that there is no possibility of obtaining successful results unless the developer is fresh and strong and contains enough bromide of potassium for keeping the whites of the print clear. The influence of even a small amount of bromide of potassium in the developer must be very surprising to any one who first becomes acquainted with Velox. It seems almost impossible that the addition of a few drops of a bromide solution to the developer should at once produce a perfect print with pure whites, when before, the same developer failed to give anything but grayish-looking flat images. What is more important, the amount of bromide which has to be added depends somewhat on varying conditions. For instance, very pure chemicals may often re-

By ROBERT DEMACHY

INNOCENCE.

quire more bromide than those which are of an inferior quality. In hot weather, also, the developer needs more bromide. When through age or for some other reasons Velox paper has beeome very dry it will be necessary to add more bromide of potassium in the developer in order to keep the whites clear. On the other hand if the amount of bromide is much exaggerated, then the black shadows in the image have a greenish hue instead of showing the velvety pure blacks which are so characteristic for Velox prints. The latter trouble may occur also if the developer has become spoiled by oxidation or if it is too dilute

There is not the slightest trouble in properly adjusting the amount of bromide. It is best to make a developer without bromide and to have a "reserve" solution of bromide of potassium and to proceed as follows: First try the developer with a small strip of the paper, then if the whites are not pure add a few drops of bromide, which will usually eorrect all this; it very seldom happens that this second addition of bromide is necessary. If, however, too much bromide has been added all that is necessary to do is to pour some fresh strong developer into the mixture.

Whoever uses Glossy Velox has to be prepared for "abrasion marks" or "surface stains" on his prints. This highly enameled surface has a deplorable tendency of showing these markings; fortunately they can easily be removed after the print is dry. The latter has only to be put on a piece of glass and by rubbing the surface by means of a tuft of cotton dipped in wood-alcohol the markings are removed in a few seconds. The matt Velox papers show these markings very seldom, and when they occur they can be erased in the same way or by rubbing them by means of a soft rubber.

A very curious defect which sometimes perplexes the beginner has received the very appropriate name of "freaks." These "freaks" appear in the most varied shape. Sometimes they look like white lines or streaks of irregularly curved shape, some other times they look as if the paper had been soiled by means of a bad brush, or as if somebody had touched it with greasy fingers. Sometimes half of the print is perfect while the other half shows the "freaks." No wonder that these "freaks" have puzzled many people. They are always due to sulphated sulphite or oxidized or too weak a developer and can surely be prevented by dipping the print in water for one or two seconds before the developer is applied. These "freaks" show mostly on Glossy Velox and on Special Portrait Velox, although some rare cases have come to my knowledge where they had occurred even with Carbon Velox and Rough Velox.

Until last year the objection could be made that Velox paper was only adapted for weak negatives because it gave strong prints. Since then "Special" Velox has been put on the market, and this renders possible the use of even very strong negatives because "Special" Velox paper gives softer prints than "ordinary" Velox.

This "Special" Velox is less influenced by an increasd amount of bromide of potassium, and it can be developed somewhat slower. "Ordinary" Velox and "Special" Velox are both made in three grades,—Glossy, Matt, and Rough. The manipulation of all these grades is practically the same and enables the photographer to select whatever kind of surface is best adapted for his particular negatives.

It is now more than three years since Velox was actively introduced among the photographic fraternity and at the present time hundreds of thousands of prints made on same in nearly every civilized country of the world are the most convincing proof not alone of its popularity but also of their permanency. I recollect some cases where prints have been submitted to me which have not kept so well; but every time upon examination I have been able to locate this trouble to be due to the fact that the prints were not properly washed, fixed, or that they had been kept damp for a long period. Even platinum prints will not keep under such conditions; furthermore the well-known fact that bromide prints are among the most permanent processes ought to be in itself sufficient guarantee of the lasting qualities of those made on Velox paper.

WOODLAND SCENERY.

BY JOHN CARPENTER.

BIRCH AND BRACKEN. By J. CARPENTER.

TO THE lover of nature woodland scenes have a great charm and are exceedingly fascinating and attractive at all times, not only when seen in full summer adornment, but also at other seasons. In winter the wonderfully varied forms of tree life are seen in perfection, the rugged boles or delicate tracery of branches and shoots form grand studies, at other times a covering of hoar frost adds to the charm.

What can exceed the beauty of the forest after a gentle fall of snow, the dark tree trunks showing darker by contrast with the white mantle covering the earth. In spring woodland scenery has perhaps a greater charm than at any other season. The tender green of the early leaves of beech and birch followed by the golden hue of oak and ash cannot fail to attract the most apathetic.

To the photographer winter and spring in the forest are full of opportunities for picture-making. If the camera be set aside at any time of the year it should certainly *not* be at these seasons. As spring merges into summer such opportunities become less as the dense masses of foliage are generally too heavy in appearance to be picturesque unless, indeed a mere transcript of a scene is desired. I know of no more enjoyable place to spend a day with the camera

Now came still evening on

SUNSHINE AND SHADE. By J. CARPENTER.

than in such a forest as we have within a half-hour's ride of London. Epping Forest is unrivaled for its varied and beautiful scenery. The trees, although not of such grand proportion as are to be found in other localities are very picturesque and afford many good subjects for picture-making. Quiet pools plentifully besprinkled with reeds and rushes are favorite subjects. In other spots birch and bracken abound in rich confusion. To the naturalist as well as the artist and photographer there is work for a lifetime. The flora is rich and varied owing to the contrast of very dry positions with damp hollows, many rare flowers are to be found, besides a large variety of the commoner species.

Little need be said regarding apparatus, etc., necessary for forest scenery. I generally use a midangle lens of moderate length of focus (a 10 inch lens being found most useful for a whole plate camera). Iso. plates or films of medium rapidity I find most satisfactory. A full exposure is necessary with a view to obtain a rather thin negative

HEATHLAND.

BY J. CARPENTER.

A WOODLAND PATH. By J. CARPENTER.

with plenty of gradation; print in platinum or carbon if permanence and artistic effect is desired. A glossy surface does *not* improve such subjects. The accompanying illustrations are characteristic of our forest and will perhaps give some little idea of its varied beauty.

APPARATUS FOR MICROSCOPICAL PHOTOGRAPHY WITH LOW POWER OBJECTIVES.

BY O. G. MASON.

THE progress of photography within the last few years and its ever increasing application in old and entrance into new fields of investigation, has led many people to attribute to its leading devotees something of the character of the prestidigitateur who seems to do the impossible. To the quiet worker who makes only portrait or landscape illustrations, with an occasional copy, the lot of the photographer must seem a pleasant one, provided he has enough to do at good prices.

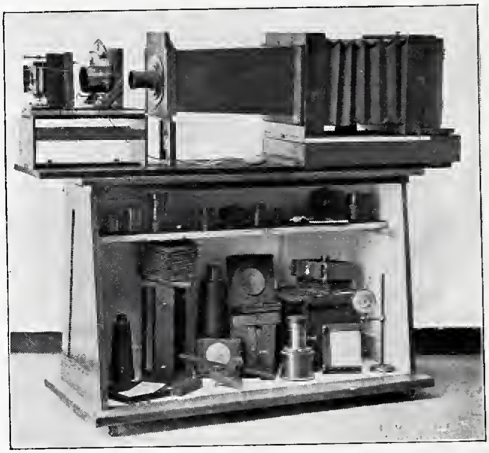


FIG. 1.

A peevish child, a fussy old maid, or a drunken man, may occasionally ruffle the serenity of his existence among mortals, and when he departs he leaves a *small* fortune for his heirs, and in the homes of his patrons many reminders of his having been.

To him who has dared to turn from the ruts of every day gallery or landscape work, troubles come in a never ending procession.

He is expected to do any and everything with chemistry and light. If he is not prepared to furnish pictures of all visible and many invisible objects, from microbes to planets, somebody is likely to look upon him as one "behind the times." Orders come in for strange and unheard-of jobs, work for which no instruments can be found, and he is compelled to stand at his bench and lathe in the daytime, and to lie

FIG. 2.

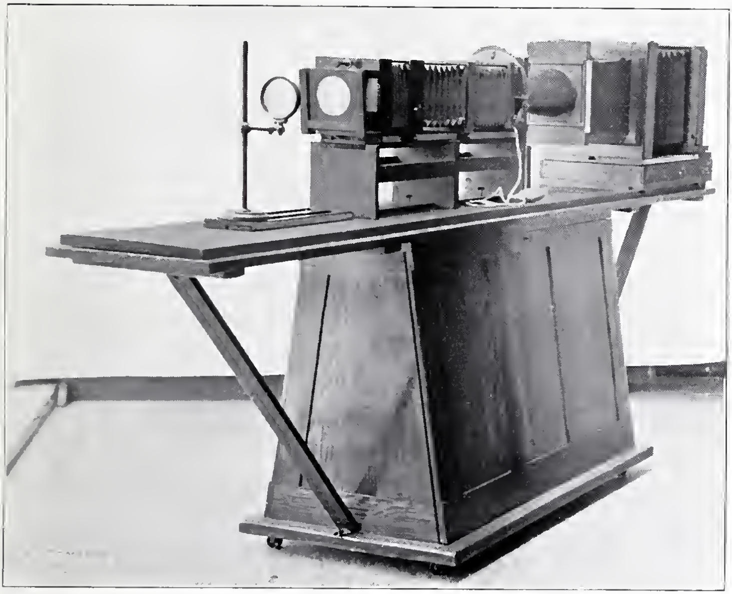


FIG. 3.

awake nights in order to prevent some patron from thinking that somebody *might* do better.

In the effort to keep a fair reputation and the goodwill of esteemed fellow workers in the fields of science, the following described and illustrated apparatus was constructed;

The problem to be solved was the making of a series of uniform negatives from a large number of microscopical sections of such size as to require only from three to ten diameters amplification. The sections were stained in the various tints usual for the differentiation of structure in microscopical work. Some would require short exposure by comparatively weak reflected light, while others would require condensed sunlight with color screens.

All the sections were of such size as to make the use of low power objectives imperative.

It was found advisable to color the light illuminating the objects instead of *after* it was transmitted to or from the objective, as is usual with screen work. A shutter or exposing device was required and the several parts must be inter-

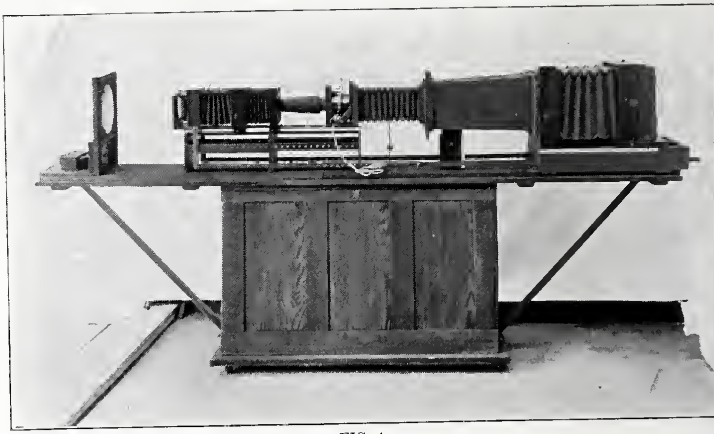


FIG. 4.

changeable, in order to adjust for variation in size and changes of objectives to suit the work in hand.

Figure I. shows the simple form of apparatus as first constructed, the parts separated to show their relation. The scale on bed of camera is important for estimation of personal equation in adjusting focus and for recording position for size. The cone extension is furnished with scale, as also is the support on which the front end of the cone rests. All these scales are useful for determining amount of movement necessary in adjusting the several parts.

The ring adopters, which have been in use—as seen on front of cone—nearly thirty years, are convenient, and great time-savers when changing objectives.

The shutter carrier is furnished with hooks for attaching it to the frame of back end of object holder. In this back frame the front end of shutter tube is accurately fitted, while the hook end of the tube is planed to receive the mounts of the several objects used. A string has been tied around the object carrier and its bellows, in order to show the parts. The bridge carrying the several parts is held in position on the base-board by thumbscrews, seen in bottom rail. The top of bridge carries a solid base frame, upon which the several parts slide for adjustment.

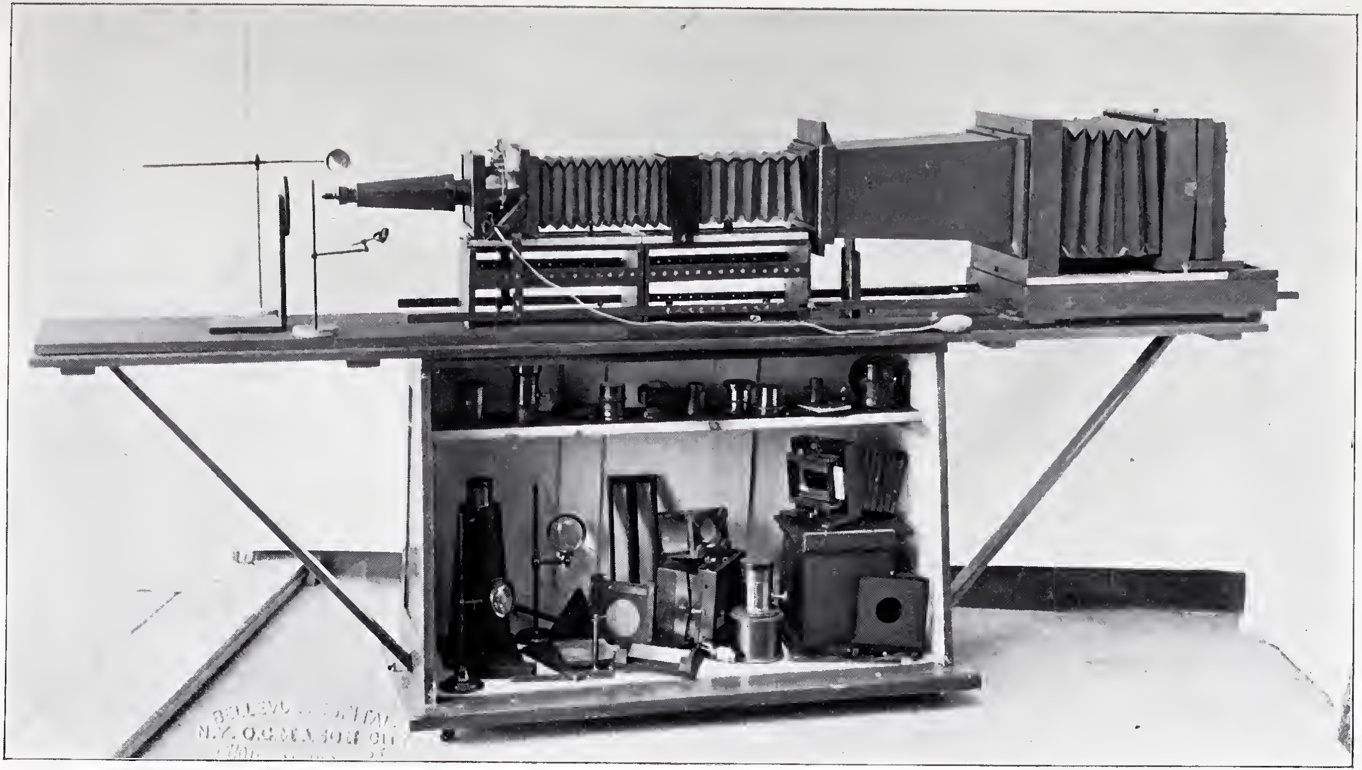


FIG. 5.

FIG. 6.

Figure II. shows the several parts in place, ready for use in two and three diameter work.

Figure III., with condenser, color screen for tinting light before it reaches object, second section of bridge, two additional lengths of bellows, round extension tube for camera cone, all mounted on stand extended by hinged leaf on each end.

Figure IV. Large condenser, object carrier, objective cone, and shutter arranged for four-diameter work, with device for front focusing and adjustment of size while operator is seated at back of camera, one of the adjustable rods for actuating the device is seen projecting from back end of bridge on which the camera stands.

Figure V. shows changes in the relative positions of parts for one class of opaque work, with front of stand removed, to show receptacle for stowing accessory apparatus.

Figure VI. Group of reflectors, condensers, and objectives, used for various classes of work and degrees of amplification. Braces have been removed and extension leaf allowed to hang at each end of stand.

The sizes of the several parts may be clearly understood when it is stated that the stand, as shown in Figures III., IV., and V., is a little more than nine feet in length, and weighs about one hundred and twenty pounds. Being mounted on castors, it is easily moved into position best suited to light and class of work to be done.

The ingenious photographer can add to and make many changes in adjustment of the parts shown, which I trust may prove interesting to some of my fellow workers.

SEA URCHINS. By EDGAR G. LEE.

"A LETTER FROM PAPA."

THE FARM HOUSE. By ALFRED STIEGLITZ.

THE THREE-COLOR PROCESS IN GERMANY.

BY OTTO GANTZER.

Copyright, 1897.
MAKING HAY WHILE THE SUN SHINES.
By J. W. DUNN.

SO MUCH has already been written that it will not be my purpose to give your readers a scientific *esposé* on the nature of this printing process. Others, more competent than your correspondent, have done so on more than one occasion, and little new is to be added. But it will certainly interest your readers to hear what progress the workers of the Fatherland have made in these five years since this process became generally known, and of the results and the experiences, the different workers in this field are having. To this end I presume that the reader is perfectly *au fait* in regard to the process itself and, therefore, confine my remarks simply to the impressions one gets from studying the many three-color prints one sees in this country daily, and to such points of interest which I have gleaned in conversing with practical men—engravers as well as printers—whom it has been my fortune to meet here.

Of the more prominent "Kunst Anstalten" in this country there is only a baker's dozen, and hardly that many, whose work comes up to a fair average, and of these again are only three or four, who will furnish work of a real meritorious character. Among these—strange to say—two of the largest and best known firms are missing, Meisenbach Riffarth & Co., Munich, and Angerer & Göschl, Vienna, who do not favor the three colors, but still employ the old process of chromotypie in five and more colors. The Vienna firm's objections are mainly of a theoretical nature, as they contend that many gray, blue and green tones cannot be reproduced by this process and that the complicity of this process with the repeated copying and transferring, and the loss of detail occasioned by this, makes the process unsuitable for real art work. To my mind, these reasons do not stand, or the firm mentioned has had no occasion to see the reproductions of later years, which by actual comparison with the original drawings prove to be facsimiles of so high a merit, that it is impossible to believe, another color more would improve the work in any degree. What the addition of another or more colors would undoubtedly bring about, is the loss of the artist's technique, a blurry indistinctness of the whole picture,—two points, which it is the good fortune of a correct three-color print, to entirely eliminate from the possibilities of this process. Of course there are colors which cannot be reproduced at the present condition of this process, as cobalt blue and its components, all the electric greens, etc. But this is not the fault of the process, but of the colors and inks as manufactured.

The process of making the plates is practically the same here as with us. The main difficulty lies in the intelligence and carefulness of the photographer. Correct negatives properly toned down insure good results and materially lessen the labor necessary for correcting the printing plates. This labor, here in Germany, of etching, re-etching, hand-tooling and retouching amounts to a great deal, in fact it seems to be the whole secret of the process, since the

SPECIMEN OF THREE COLOR WORK.

GEORG BÜXENSTEIN & COMP.
BERLIN GERMANY.

necessary negatives are generally made in three or four days, while the printing and finishing of the plates takes as many weeks. Orthochromatic dry plates are used for the first exposure, wet plates for the screen negatives, a hard negative generally gives the best results. I found the Carbutt color filter mainly in use, and in only one or two instances came I across dry collodion filters which were not factory made. Aniline colors in alcohol are used here for these filters, which, however, change easily, no matter how carefully kept, so that the spectroscope is constantly employed to determine their condition. Where a spectroscope is not available, trial exposures should be made from the three colors, which in the form of printing inks are rubbed onto paper. Then it will be seen, if the filter shuts out the corresponding colors. Filters are carefully kept in a steady temperature of 75 degs. F., and are used behind the lens and close to it. Lenses are to be carefully selected, such without a chemical focus; they are apt to throw pictures in different sizes for each different color. The anastigmats of German make give good satisfaction. The Levy screen—175-150 lines—is exclusively used here; it should be turned exactly 30 degs. for each color to escape the so called "*moirée.*"

In this whole process everything of course depends on the proper adjustment of the three negatives to each other. The red plate is considered the worst one of the lot and gives the most trouble. Up to date there is no such thing as a faultless red negative, which could be used without retouching; the main difficulty, however, lies in the copying and printing and etching from these negatives, in the work of putting the three printing plates in proper accord to each other. At this point mention must be made of the work of Dr. Selle, who invented the art of putting three colored gelatine films over each other and thereby produces a diapositive from nature. The greatest merit by far of his work, however, is, that his negatives and positives do not require any retouching and as I happen to know, are not retouched in any manner. Dr. Selle is an amateur and furnishes the negatives to gelatine printers, who get excellent results by treating the gelatine plates in the ordinary manner. His exposures with dry plates and daylight are timed by seconds, while other workers in daylight use 2–5 minutes for one exposure and with electric light as much as an hour. The time of the three exposures is in the proportion of 1 to 4 to 12 according to the colors. Among the publications of recent date, two especially have drawn the attention of the interested public. One, a set of 20 tables, representing flowers and plants, made by Husnik & Haeusler, Prag; the other a set of some dozen animals, from the works of George Büxenstein & Comp, Berlin, are the *ne plus ultra* of three-color prints ever published on this or any other continent.

Comparing these with the original drawings, it is evident that no artist lithographer could reproduce them more true in color and tone or show the technique of the artist to better advantage. As a rule the German printer, who cultivates this class of printing, submits his prints or proofs to the artist, who drew the original, and follows the suggestions of this critic in every way. That the result thus obtained is a highly creditable one goes without saying for him who knows the highly developed state which the art of painting and drawing has reached in this country. The fact, that all the best known and most celebrated professors and teachers of painting of this country have expressed their satisfaction with the results which may be obtained by this process, speaks certainly worlds in favor of it.

And now a word about the printing from such plates. The best press here in use for this class of work, is a stop cylinder built by König & Bauer, with improvements suggested by the foremost practical printer of this country, Mr. George W. Büxenstein. It is a stop cylinder, with perfect ink works, and a special arrangement to insure absolute register, runs at a speed of about 1,000 per hour, and permits to keep the loss from bad register and other sources down below 6 per cent. Printing editions of more than 10,000 the loss falls still below that figure. Each color must be allowed to perfectly dry before running the second color; absolute evenness of temperature is necessary to keep the paper from stretching or shrinking; and cleanliness and a careful handling throughout are required. The Germans have no doubt succeeded to make this process useful for many purposes, as it is applied to publications of art and science, where in many instances, the limited art of the lithographer has failed to do full justice to the work. The Germans also have succeeded to reduce the cost of such work to a point that it may well compare with work done in eight colors from stone and be infinitely more meritorious from an artistic standpoint, which leaves no doubt to my mind, that in this country at least, the three-color process has a great future in store and will in time revolutionize all color processes in existence at present.

By S. S. S.

"Crisp foam flakes scud along the level sand
Torn from the fringe of spray."—Tennyson.
By F. H. WORSLEY BENISON.

FLIGHT OF SEA BIRDS FROM THE STACK ROCKS, PEMBROKESHIRE.
By F. H. WORSLEY BENISON

HOW TO MAKE A DARK ROOM LANTERN.

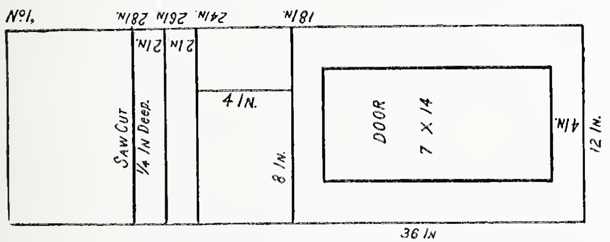
BY C. R. ARNOLD.

Material to Make Dark Room Lantern.

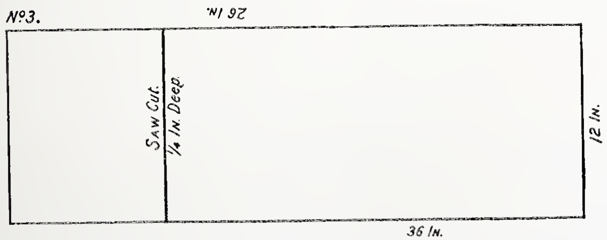
Three boards	12 x 36 x $\frac{7}{8}$ inches
One board	12 x 18 x $\frac{7}{8}$ inches
One board	12 x 14 x $\frac{7}{8}$ inches
One board	12 x 14 x $\frac{7}{8}$ inches
One board	$6\frac{1}{2}$ x $8\frac{1}{2}$ x $\frac{7}{8}$ inches
Two boards	10 x $1\frac{1}{4}$ x $\frac{7}{8}$ inches
Two boards	30 x $1\frac{1}{4}$ x $\frac{7}{8}$ inches
Two pieces sheet iron	8 x 14 inches
Two pieces sheet iron	8 x $12\frac{1}{2}$ inches
One piece sheet iron	$12\frac{1}{2}$ x $20\frac{1}{2}$ inches
Two pieces sheet iron	$1\frac{1}{2}$ x 28 inches
One ruby glass	8 x 10 inches
One amber cathedral glass	8 x 10 inches
Two orange ground glass	8 x 10 inches

Directions for Making.

Cut with a saw across two of the 36 inch boards as shown



in cut No. 1. Cut the 36 inch board as cut No. 3, and the 14 inch board as cut No. 4. Bore 1 inch holes in the 12 x 14



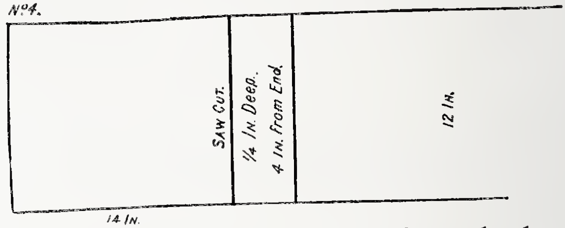
inch board as cut No. 5, and nail it to the $6\frac{1}{2}$ x $8\frac{1}{2}$ inch board as cut No. 6.

Ventilation.

Bend the $12\frac{1}{2}$ x $20\frac{1}{2}$ inch iron as cut No. 8. Cut an opening through the 12 x 18 inch board 6 inches from the lower end

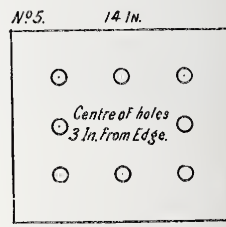
7 x 9 inches square, and likewise through one of the 36 inch boards, and through the other 36 inch board cut a hole 7 x 12 inch; see cut No. 1. Cut a hole through one of the 8 x 14

No. 4.



inch irons 1 inch diameter and 6 inch from the lower end, Cut two grooves in the 1¼ inch strips to receive the glass and a third groove in the long strips to receive the sheet-iron sliding door that has the hole cut in it. The cathedral and the orange glass are to be used in connection with the sliding door, the small hole through the door to examine density by. The ground glass is to be placed on the outside, but the ground side turned in, the ruby and the orange to be used together separated by the grooves about one-half inch, cut No. 7 shows the end of the grooved strips.

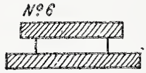
No. 5.



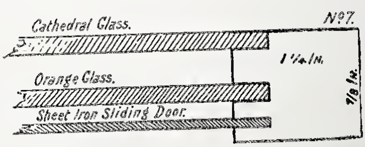
To put it Together.

Nail the three 36 inch boards together and at the same time put in the sheet iron 8 x 12½ inch and the 12½ x 20½ bent

No. 6

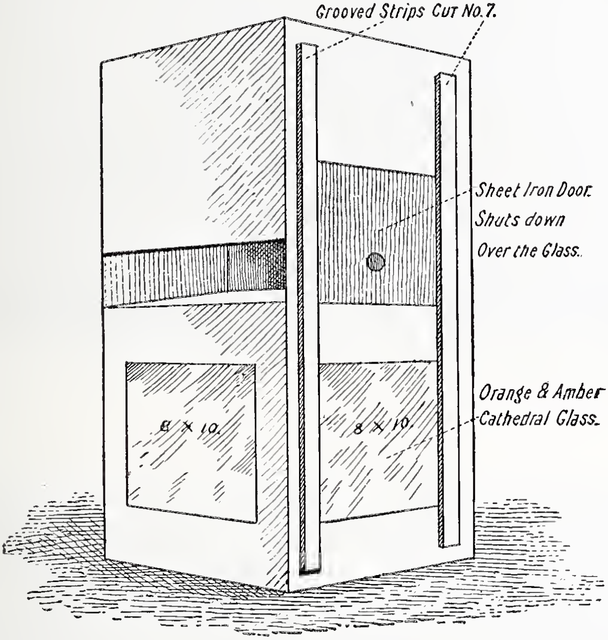


No. 7.



No. 8.

one as in cut No. 8. (This gives you a nice place to warm a plate while developing in cold weather, and also shuts the light from the top of the lantern). Next nail in the 12 x 14 and the 12 x 18 inch boards, then nail on the bottom. Put on the strips to hold the glass, also the strips of sheet iron to hold the 8 x 14 inch sliding door over the 7 x 12 inch opening. Put strips of thin cardboard 1 inch wide under the iron strips to make room for the sliding iron door. Bore a hole half through center of the bottom, and put a piece of iron in



the bottom of the hole. Put a screen bolt up through the bench or table that the lantern is to sit on; set the lantern on the bolt and secure the top of the lantern with another screw bolt so the lantern will revolve easily.

AT MONTEREY By OSCAR MAURER.

THE HOUSES OF PARLIAMENT.

A WET NIGHT, TRAFALGAR SQUARE.
By PAUL MARTIN. (By permission of the Autotype Co.)

A CORNER OF TRAFALGAR SQUARE.

THE EMPIRE LEICESTER SQUARE.
By PAUL MARTIN. (By permission of the Autotype Co.)

LONDON BY NIGHT.

PHOTOGRAPHY AS AN AID TO THE HAND-WRITING EXPERT.

BY WILLIAM J. KINSLEY.

(EDITOR *Penman's Art Journal and Hand-Writing Examiner.*)

FERN SPRING FALLS, FAYETTE, VA.
By FRED. R. RAVEN.

THE art of photography comes to the aid of the hand-writing expert in nearly every case he has and can be used in various ways.

Where it is impossible to have the original writing at hand, or where it would not be advisable owing to damage from handling, or danger of losing it, it is of the greatest importance to have accurate photographs of the questioned writing for leisurely study. While nothing is so good as the original itself, the next thing to the original is a good photograph. Courts as a rule admit of the use by witnesses, lawyers and jury of properly authenticated photographs. While this is the rule, the courts vary, and it is a matter that is entirely within the discretion of the court. In but one case in my experience were photographs declared inadmissible—and that in a murder trial in the County Court in Brooklyn. The Court held that since the originals were in evidence they were the best evidence. The jury could have followed my testimony much better had each one been permitted to have a set of photographs of the anonymous letters in question.

By the aid of photographs of the questioned hand-writing in the hands of the court, jury and attorneys, the expert is enabled to make himself perfectly clear and to save much time for the court. If a stop had to be made at each stroke or letter to which attention was called by the witness to allow the court, twelve jurymen and from two to a dozen lawyers examine it one at a time, it would drag out the testimony of the expert witness to an almost interminable length.

The photographer can be put on the witness stand to vouch for the accuracy of the photographs, and the jury and attorneys can be given opportunity to compare the photographs with the originals if deemed necessary.

Sometimes enlarged photographs of disputed signatures and other hand-writing can be used to great advantage for purposes of study and for demonstration in the court room. The microscope is much used by the hand-writing expert for close examination of lines and letters, but necessarily the field is limited, while with enlarged photographs the whole field covered by the signature or piece of writing may be shown. The quality of line, pen tremor and minute peculiarities stand out in bold relief in enlarged photographs so as to make many points plain to the eye and mind of the layman that could not be observed from a natural size photograph—or from the original itself.

I have in mind a case where several hundred thousand dollars worth of notes were forged by a young lawyer and the name of an old man attached to them, The old man had a decided and peculiar tremor in his hand which produced a characteristic and singular zigzag quality of line. The young lawyer had observed it and imitated it, but the microscope and enlarged photographs brought out the fact that the forged in every case had twice as many zigzag breaks in it, in a given length of line, as the genuine. The enlarged photographs made this and other points plain to the jury and the young lawyer was convicted of forgery.

It is possible to show on a screen by means of a stereopticon, a greatly enlarged *facsimile* of a piece of disputed writing and thus bring out points not observable in the original document. I had a case in central New York a few years ago where some notes against a dead man's estate were disputed. Upon examination I found that the signatures were genuine, but that the body of the papers had been erased and a wording making them promissory notes for several thousands of dollars substituted. A microscopical examination revealed that acid and a sharp instrument had done the erasing. A young Cornell graduate and expert photographer made plates, both positive and negative, of the disputed documents, and when these were thrown on a screen by means of a stereopticon faint traces of the original date line (many years prior to the date on the notes) in the hand-writing of the deceased, could be seen. The disputed papers were evidently originally receipts, and the wording had been erased and the genuine signature left. The jury disagreed ten to two in favor of the defendant, (the executrix of the will) the side which made the stereopticon demonstration.

Photographs sometimes are useful in reproducing pen and pencil furrows where the writing has been erased and it becomes desirable to read it as it appeared originally. It is possible, at times, to photograph the paper at such an angle that the pen or pencil tracks will cast a well-defined shadow and bring out the lines sufficiently strong to permit of their being read.

By photo-engraving and photo-lithography many *fac-simile* copies of disputed and genuine writings can be made, and then by cutting out letters and words and pasting them on sheets so as to form either the disputed or genuine writing it enables the expert, court and jury to study two complete sets of writing—one genuine, the other disputed—where every word is the same. This permits of closer comparison than if letters had to be compared with others not in the same relation.

A peculiar case which recently came to the writer was one in which photography played a part. A suit for hundreds of thousands of dollars hinged on a certain type-written letter, which the recipient claimed was lost. The letter copy-book of the writer was placed in evidence, and a very imperfect and dim copy of the original letter was found in it. In copying the letter had been moved and this caused two impressions to be taken, and from an off-set from other letters in the book or from sheets used as interleaves to prevent blurring, still another partial impression was

"A STUDY."

BY GEORGE HANKINS

made—three impressions on the same sheet, and all faint at that. A photograph was made by Mr. David N. Carvalho. This was difficult to do because of the color (blue) of the ink used in the letter, the dim outlines, and the restrictions of the court in regard to handling the letter. The photograph was not as distinct as the original, but it was useful to mark over, thus allowing of no dispute as to the exact places where certain letters and words appeared. Courts have held, as in this case, that where the original cannot be produced, that *facsimile* copies (including photographs) may be used as "secondary evidence."

By means of a photo-engraved *facsimile* of genuine and disputed hand-writing (and a very poor job of engraving it was) the friends of Captain Dreyfus were enabled to submit to the leading experts of the world the principal points at issue in that celebrated case—the identity of the writer of the incriminating, unsigned note. Among others it was sent to our office and we had an opportunity of studying it, and judging from the poorly engraved and printed specimens sent us, we thought that the disputed letter was not written by Captain Dreyfus.

With the microscope on his left and photographs on his right, the hand-writing expert thus re-inforced will be able, better in the future than in the past, to protect property, liberty, life, and happiness—and no other one agency will be of so much service to him in his work as photography.

INNOCENTS ABROAD. By GEORGE TINGLEY.

STUDY.

BY ROBERT DEMACHY.

THE USE OF AN ACTINOMETER FOR "HAND-CAMERA" AMATEURS.

BY FRANK H. TREGO.

O'ER LAKE AND FELL, ULLSWATER.
By JOHN BUSHBY.

THE successful use of the actinometer (exposure meter) is rarely heard of and my object in writing this article is to help out any of my brother amateurs who may have failed to reap the expected benefits from this handy little instrument, for I have found it of untold benefit and aid in all cases where I had any doubt as to the correct exposure to give. The instrument I use is made by Wynne, and is the size and shape of a watch.

A party of professional photographers went to photograph the Grand Cañon of the Colorado a few weeks ago and one of them carried an exposure meter with the result of over-exposure in almost every case and consequent disgust and enmity for the instrument. He evidently depended upon the pamphlet of instructions and card of "speed numbers" which accompany the instrument and cannot be relied upon except in very few cases as regards the "speed number" of the plate you are using. This speed number must be found by *experimental exposures* and when once determined you will have no further trouble.

This is accounted for by the fact that few lenses are at all alike as regards quickness and a speed number suitable for one lens may be entirely too high or too low for another.

The "speed number" given upon the card for Cramer's Isochromatic Medium dry plates is (*f*/56) while with my lens the correct number I have found to be (*f*/200), showing that my lens requires but one-fourth the exposure called for by the number given upon the card.

By J. L. NIX.

MOONLIGHT.

As the speed of a shutter is liable to vary if turned to different exposure speeds very often, it is best to use one speed only (say $\frac{1}{25}$ second) and regulate the modifications of the exposure speed by the use of different diaphragms.

In order to find the correct "speed number" for the plate and lens you wish to use, proceed as follows: First determine whether the speed of your shutter is actually as marked, by the method described in my article upon that subject. Set your shutter at the speed you intend to use constantly and do *not* change it. Now expose four plates, upon the same landscape, group of houses or whatever you may have handy, with the following diaphragms respectively: *f*/3, *f*/6, *f*/12, *f*/24. Develop these four negatives and see which is the most perfect.

Comparison, now, with the actinometer (which we will assume has changed to the proper color in 10 seconds) will show your speed numbers to be—for *f*/3 = No. *f*/56; *f*/6 = No. *f*/100; *f*/12 = No. *f*/200; *f*/24 = No. *f*/320. Now by selecting the diaphragm which gave the best negative and placing it opposite the $\frac{1}{25}$ second (or whatever speed you used) you will find the correct "speed number" opposite the 10 seconds (or whatever time the color took to change to the proper tint).

If, with that plate or film and that lens, you will stick to the "speed number" just found you will be able to give the correct exposure under all conditions. Follow the instructions given in the pamphlet as to use of instrument and especially remarks upon page 8, but pay no attention to the "speed numbers" given upon the card.

Keep in mind the following rule and use your shutter at the one speed for instantaneous work: By multiplying the diaphragm number by 2, you *divide* the exposure by 4. By dividing the diaphragm number by 2 you *multiply* the exposure by 4. Example: *f*/8 gives 4 times the exposure that is given by *f*/16.

Do not condemn the actinometer without a fair and intelligent trial and you will never be without it.

By S. S. S.

NOVELTIES OF THE YEAR.

PYROCATECHIN.

The ideal developer has at last, after many years of experimenting, been produced, chemically pure, by a secret process, at a price which will enable the photographer and amateur to use this advanced chemical agent, without being at more expense than he would in the case of hydroquinone or pyrogallic acid.

Pyrocatechin was strongly recommended by Prof. H. W. Vogel as the best developer, and one which was capable of great possibilities, but owing to the great cost of the production of the chemical—which made it necessary to be sold at a very high price—coupled with the fact that it could not always be procured chemically pure, it was necessary to abandon it. However, Dr. Ludwig Ellon has, as announced in the foregoing, at last obtained the desired result.

The formulæ for pyrocatechin developer are as follows :

I. For Ordinary Photographing :

(according to mr. h. w. vogel.)

Water	1000 grammes
Crystallized sulphite of soda	25 grammes
Crystallized carbonate of soda	50 grammes
Pyrocatechin	10 grammes

STUDY FOR PARTHEUSA.

BY HOWARD GREY DOUGLAS.

II. According to Mr. J. M. Eder.

Solution A.

Pyrocatechin	1 part
Sulphite of sodium	4 parts
Water	50 parts

Solution B.

Potash	4 parts
Water	40 parts

1 volume of A is mixed with 2 volumes of B.

III. Quickly-working Developer for Ordinary and Instantaneous Developer.

Solution A.

Pyrocatechin	5 grammes
Crystallized sulphite of sodium	25 grammes
Water	250 grammes

Solution B.

Ordinary crystallized phosphate of sodium	47 grammes
Caustic soda (purified in sticks)	5 grammes
Water	250 grammes

For use, mix one part of A with one part of B, and one part of water.

For diapositives prescription No. 1 was followed.

For bromide paper the solution prepared according to prescription No. 1 is diluted with the same volume of water.

THE MILLS' ELECTRIC FLASH WAND

MILLS' ELECTRIC FLASH WAND.

is, as its name indicates, the magic rod of the photographer, which lights his way to a thousand artistic possibilities. The complicated and always more or less dangerous lamp has heretofore been a serious drawback to flash light photography. It has to be placed in a certain position, and requires an amount of fussing and care that invariably engages the attention of the sitter or the people being photographed, and gives to the countenance a frightened look, which defeats the ends of artistic photography.

The Mills' Electric Flash Wand produces light without the use of match, taper, or other visible source of ignition; the photographer simply presses an invisible button and the wand "does the rest."

It can be held at any angle, up high, low, or toward the ground, so that every variety of lighting can be obtained

It produces hardly any smoke and no dust, so that it may be used in the most richly furnished room without discomfort or detriment to the hangings and furniture.

It is absolutely safe when used with judgment, and by placing it on a tripod the operators can be included in the picture.

The Electric Flash Wand opens a new field to amateur photography, for, as it requires no burning match or taper for ignition, no complicated handling of powder, which would be blown by the wind, interesting groups may be secured in the open air, on the verandas of private residences, or piazzas of hotels in summer resorts.

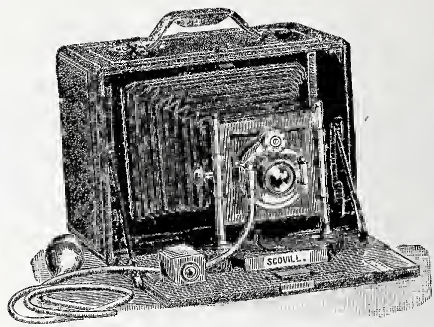
PORTRAIT STUDY.

BY STEBBING.

For certain ignition by the spark without the use of gun-cotton with its anticipatory announcing puff, a new compound had to be found, and search was made amongst such materials as were not explosive by friction The result is "Scovill's Electric Compound," which we use in the fuse boxes, and recommend to augment the flash when necessary, although this can be done with your own, or any other compound (being careful that only the Electric compound comes in contact with the fuse), yet the least smoke in proportion to illumination and speed is obtained by its use alone.

THE SOLOGRAPH

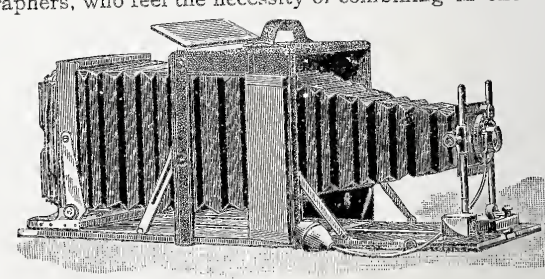
is an essentially high grade camera, but in the construction of which the least weight and volume have been equally important aims with other desiderata. This camera has a double swingback swinging from the center, rack and pinion movement, reversible finder with hood to



screen the visual, has a rising front, and is fitted with a double rectilinear lens with Unicum shutter. The shutter is exactly the same as the one furnished with the Henry Clay. Lastly there is the

THE LONG FOCUS REVERSIBLE BACK SOLOGRAPH.

The name of this camera is in itself a description of the instrument. It is a Solograph camera, designed for the more advanced amateur photographers, who feel the necessity of combining in one instrument,



in a practical way, the features which are requisite for almost universal application, this without materially increasing the bulk, weight, and

A SAIL IN SIGHT. By WALTER BURKE.

A REFLECTION. By W. S. PAXSON.

price of the apparatus. The Long Focus Reversible Back Solograph resembles the regular Solograph. It is of the same high grade of workmanship, made of selected mahogany, well dove-tailed throughout, with French hand polish. Its brass trimmings and adjustments are all hand-made, possessing the neatness and accuracy which, for the same reason of being hand-made, the Swiss watches possess. It has a double swing-back swinging from the center, rack and pinion movement, reversible finder with hood to screen the visual. It also has a front that may be raised, lowered, or slid to either side, as the foreground should require. The front operates on two brass rods, which allow any desirable latitude in adjusting the foreground in the picture. As the name indicates, it has a reversible back, which adjustment is of the greatest importance when the camera is used on the tripod, the position of the plate being readily changeable without moving the camera. It has *a greater focal capacity* than any other similar camera on the market.

This camera is of inestimable advantage for photographing surgical operations, where it is necessary to obtain as large an image as possible.

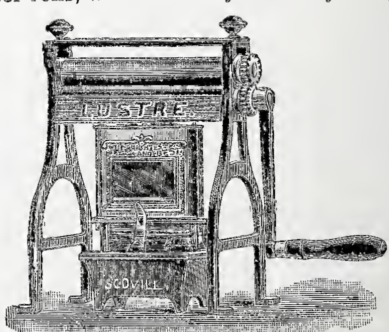
For the use of long focus lenses—for copying, enlarging, and all other purposes requiring an extended length of bellows, the Long Focus Reversible Back Solograph is particularly well adapted.

The Lens is the Solograph Rapid Rectilinear. Being symmetrical, the front combination may be removed and the rear lens used alone, which practically doubles the focus. For mountain scenery and subjects at long range, this is often an advantage, as the objects in the view appear larger in the picture.

The new Unicum Shutter having a triplicate movement, with Iris Diaphragm, Pneumatic and Finger Release, is furnished with the Long Focus Reversible Back Solograph, and forms a prominent part of the outfit. It works between the lenses without noise or jar, and may be adjusted for time exposures as well as for rapid instantaneous work.

THE LUSTRE BURNISHER

is a Professional Burnisher at a price within the reach of the Amateur. This Burnisher is made of the finest material. It has double 8-inch nickel-plated steel rolls, which are adjustable by two pressure screws



with rubber tips. The rolls revolve by moving a finely geared side crank. The Burnisher is supplied with oil lamp or gas connectors. Only a limited quantity of these Burnishers have been made, and they are certainly marvels for the low price charged.

CHILDHOOD TRIALS.

Copyright, 1898.
By A. C. THOMAS.

THE NEW PLAYMATE.

By C. L. BAER.

THE HAGO SCREEN AND PLATE HOLDER.

This latest holder for the line screen and plate is calculated to revolutionize half-tone engraving work. In mechanism it provides:

First: For moving the screen to any distance from the sensitive plate.

Second: For giving the screen by means of an outer finger-piece, a parallel micrometric displacement to either side, and at any of the distances from the sensitive plate at which it may be set.

Third: For giving the sensitive plate, by means of another outer finger-piece, a crosswise parallel micrometric displacement, and at whatever distances therefrom the screen may be placed.

Fourth: For giving by means of another finger-piece, either the screen or the plate or both, a revolving or oscillating motion to any angle of inclination desired, and at any distance the screen and plate may be removed from or towards each other.

The superiority of this holder over all others in its capabilities and adaptabilities for an improved practice, according to the conclusions of the most recent investigations, is manifest by the following items:

It is the only holder which, in all its changes of distance, moves by means of internal guides, in a direction so exactly vertical that the photographic impression made at any one distance of the screen from plate registers with the impression made at any other distance.

It is the only holder which, while moving in so exact a vertical direction, keeps the screen simultaneously in perfectly parallel relations with the sensitive plate.

It is the only holder which, while moving vertically to and parallel with the sensitive plate, provides *during the exposure* for moving the screen to any required distance or distances, by means of a single outer finger-piece.

It is the only holder which, by means of a single outer registering finger-piece, can instantaneously set the screen to that mathematically exact distance which is required for the selected stop and for each camera extension, and thus at once dispense with all the usual care, time, and trouble of focusing the screen for each camera extension.

It is the only holder which permits the screen, while being employed with the small shadow stop, to be moved to its normal distance (which is always one far removed from the sensitive plate), and then, during the exposure with a large stop for the high-lights, permits the screen to be moved back to *its* normal distance (which for this stop is one always close to the sensitive plate); an important departure from present practice in which the screen is held at one distance only during the use of both stops.

This is the only holder which can be and which is accompanied by two columns of numbers printed on each stop; the numbers of one column showing each, a camera extension in inches, and the numbers of the other column each showing the notch on the finger-piece to which to turn for setting the screen to the parallel corresponding number for camera extension.

This is the only holder which, by allowing the screen to be set at its normal distance for the shadow stop as well as for the high light stop, provides the only method for producing the smallest possible dot in the shadow, which is now known to be necessary in order to obtain the most perfect gradation, for it is now mathematically certain that this smallest possible dot cannot be obtained unless the screen, while in the use of the small shadow stop, be at its normal distance, which is one much further removed than its normal position with the larger stop,

WHEN A WILLOW GROWS ACROSS A BROOK. By J. MILLMAN BROWN.

ILFRACOMBE HARBOR. By J. MILLMAN BROWN.

and it must be quite obvious that the formation of this smallest possible dot is the necessary condition for a true and wide range of gradation. When the screen is at the same distance during the exposure for both stops, as is the case in common practice, it is impossible to secure perfect gradation in the shadows.

THE BYRON FLASH-LAMP.

Most flash-lamps procurable have inadequate illuminating power. They either do not consume magnesium enough, or not quickly, nor effectively. Even in interiors without life it is an advantage to use a powerful light to get there before the smoke does, especially if the currents of air are from behind. And with people, the confidence a

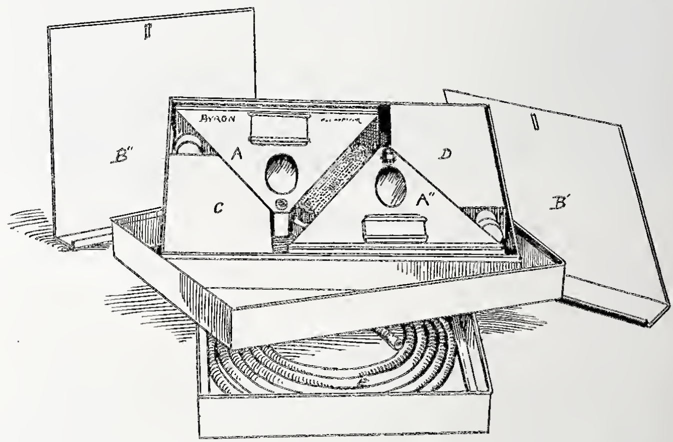


FIG. I.—A′ A″ LAMP IN CASE. B′ B″ REFLECTOR TO SLIDE IN GROOVE BACK OF LAMP. C FLASK FOR MAGNESIUM. D FLASK FOR ALCOHOL. E RUBBER TUBES.

good light gives you is of great assistance; you can see they are still and used to the light before commencing the exposure. Artistic effects are best obtained by light of larger area, and this is the more easily effected by having more than one point or source of light, and with one well forward to one side—moving them during exposure—you get modeling and relief.

Though of secondary importance, the following points should be noted in selecting a lamp.

It should not be awkward in bulk or shape, but rather pack with your apparatus when not in use. It should be easily and quickly gotten in action, and repeatedly operated without much thought or attention.

In the "Byron," a Duplex lamp, these points have been met and covered in a brainy way by one "who has been there himself." They come in pairs for artistic lighting. It packs with your other traps. It gets in action quickly. It keeps in action easily. It is powerful, yet not wasteful. It is safe and certain.

A STUDY.

BY GERTRUDE WALLIS.

THE "PERFECT" ROTARY DEVELOPER.

This is an entirely new and simple device for developing, fixing and washing films in strips. In appearance it looks something like a Ferris Wheel. Among its many advantages are:

With it you can develop, fix and wash a film in less than one-third the time formerly consumed, and with no more labor than just simply turning the wheel.

It is the simplest possible device, and so easy of manipulation that a child might develop, fix and wash any film, a piece of work that formerly required skilful manipulation and great labor. With it the danger of scratching the face of the film in handling is entirely removed.

It is adapted to take the film of the Pocket Kodak, Bullet, Bull's-Eye, Hawk-Eye, Baby Hawk-Eye, Presto, Kombi, and various other cameras.

It is provided with a division in the surface of the wheel, so that a constant examination of the development is permitted during the process of developing, fixing, and washing by transmitted light.

It makes the process of washing most thorough, by simply turning the wheel in a tray of, or running water.

With it you can dry your films by turning wheel, thus creating a current of air. If extra haste is required, rotate first in a tray containing alcohol.

It is provided with a set screw so that the wheel can be raised or lowered to any point, permitting the use of a minimum amount of developer. In the removal or changing of trays, the wheel can be raised and the tray removed or changed without danger to the film.

ARROW-ROOT MATT-SURFACE PAPER.

After many years of scientific research a preparation for the salting of plain photographic paper has been discovered, by which method the finest printing results are obtainable. The advantages are apparent to all.

I.—Constant use will not discolor the silver bath.

II.—Will produce the finest detail in printing.

III.—Any desired tone may be obtained from sepia to jet-black with less gold than ever before.

IV.—The "*New Matt Surface*" paper when sensitized will keep fresh for a long time if properly stored.

Silver Solution. Ammonia Nitrate of Silver:

Silver, - - - -	480 gr. Troy.
Water, - - -	11 ounces.

Dissolve and pour off 2 ounces, and to the 9 ounces left add strong Aqua Ammonia to form a precipitate and redissolve the precipitate, then add the remaining 2 ounces which will form another precipitate, to this add 9 drops of Nitric Acid, C. P. Apply to the paper with a tuft of cotton. See that the sheet is well covered when dry. Print without fuming.

Any good Toning Bath will give good results, but the very best results are obtainable by using Clemon's Aluminum Toning Bath, which is prepared as follows, viz.:

Formula, Stock Solution:	Chloride Aluminum, - -	80 grains.
	Bicarbonate Soda, - -	360 "
	Water, - - - - -	48 ounces.

SUNSET. By E. NICOLAI

BORDER ARGUMENT. By W. H. WALKER.

When mixed this will form a flocky Hydrate which will settle to the bottom. It can be strained through clean washed muslin. To prepare a small bath for toning, take 12 ounces of the Stock Solution and add sufficient gold to tone in 8 to 10 minutes. The Gold Solution must be neutralized with Bicarbonate Soda before adding to the above bath. When the prints reach the desired tone throw them into a bath of salt water, made of water, 1 gallon, table salt, 1 ounce, this will arrest further toning and at the same time turn the free Nitrate of Silver, that is left after the first washing, into a Chloride, and the Hypo bath will clear, or fix them, very much quicker. By using the Aluminum bath the prints change very little in tone in the fixing solution. If you have albumen prints tone them first; generally there is enough gold left to tone a large amount of plain paper prints.

The Fixing Bath:	Hypo, - - - - - -	2 ounces.
	Water, - - - - - -	12 ounces.

Prints will fix in about five minutes, with but slight change in tone.

By S. S. S.

By E. ATKINSON.

A SUMMER SEA.

Standard Formulae

and

Useful Recipes.

THE WET COLLODION PROCESS.

1.—Negative Collodion.

Ether	¼ fluid ounce
Absolute alcohol	½ fluid ounce
Pyroxyline	5 gr.
Iodide of ammonium	5 gr.
Bromide of cadmium	2 gr.

2.—Ferrotype Collodion (Estabrooke's).

Iodide of ammonium	30 gr.
Iodide of sodium	10 gr.
Iodide of cadmium	20 gr.
Bromide of cadmium	20 gr.
Ether and alcohol (of each)	5 fluid ounces
Pyroxyline, sufficient quantity, say	25 gr.

3.—Collodion for the Reproduction of Line Work (Volkmer's).

Plain Collodion.

Ether	700 C.c.
Alcohol	490 C.c.
Pyroxyline	16 Gm.

Sensitizer.

Chloride of calcium	1.6 Gm.
Iodide of ammonium	4.7 Gm.
Iodide of cadmium	7.8 Gm.
Absolute alcohol	123 C.c.

After being perfectly dissolved, mix.

4.—Enamel Collodion.

Alcohol (.82)	48 fluid ounces
Ether (.72)	64 fluid ounces
Pyroxyline	1 ounce
Castor oil	10 minims

5.—Silver Bath for Wet-Plates.

Nitrate of silver	1 ounce
Distilled water	10 fluid ounces

Iodize and acidulate with nitric acid.

6.—Silver Bath for Ferrotypes (Estabrooke's).

Nitrate of silver	4 ounces
Water	64 fluid ounces
Iodide potassium	2 gr.

Dissolve, sun for three or four hours, filter and acidulate.

7.—Developer for Ferrotypes, by E. P. Grishold.

Protosulphate of iron and ammonia	4 ounces
Water	64 fluid ounces
Acetic acid, 1.048 (U. S. Ph.)	4 ounces
Yellow rock candy	½ ounce

8.—Developer for Wet-Plates.

Sulphate of iron and ammonia	1 ounce
Acetic acid, 1.048 (U. S. Ph.)	1½ fluid ounces
Water	16 fluid ounces

9.—Developer for Hard Negatives (Line Work) Wet-Plates.

Protosulphate of iron	5 Gm.
Water	100 C.c.
Tartaric acid	1 Gm.

DEVELOPMENT OF GELATINE EMULSION PLATES.

22.—CARBUTT'S PYRO DEVELOPER.

No. 1. Pyro Stock Solution.

300 C.c.	Distilled or ice water	10 ounces
1 Gm.	Oxalic acid	15 gr.
2 Gm.	Bromide potassium	30 gr.

Then add Schering's pyro, 1 ounce (30 grammes), and water to make 16 fluid ounces (480 C.c.).

No. 2. Stock Soda Solution.

300 C.c.	Water	10 ounces
60 Gm.	Soda sulphite crystal	2 ounces
60 Gm.	Soda Carb. Crys. (or dry gran. 1 oz)	2 ounces
30 Gm.	Potash Carbonate	1 ounce

Dissolve, and add water to make measure 16 fluid ounces (480 C.c.).

No. 3. Bromide Solution.

14 Gm.	Bromide of sodium or potassium	½ ounce
150 C.c.	Water	5 ounces

Pyro Developer.—Dilute 2 ounces of stock No. 2 with 7 ounces of water for cold weather, and 10 to 12 of water in summer. To 3 ounces of dilute No. 2 add 1½ to 2½ drachms (6 to 10 C.c.) of No. 1. The more pyro the denser the negative, and *vice versa.* No yellowing or fogging need be apprehended if our directions are followed. Development should be continued until the image seems almost buried, then wash and place in fixing bath.

For instantaneous exposures, take for a 5 x 8 or 6½ x 8½ plate 3 ounces of dilute No. 2. Lay the plate to soak in this, and cover pan. Put 2 drachms of No. 1 into the graduate, and 3 drops of bromide solution. Pour the soda solution off of the plate into the pyro and back over the plate; let development proceed, and examine occasionally. Keep solution in gentle motion over the plate. A *very* short exposure may take ten minutes to fully develop. If the image is not fully brought out this time, add to developer in pan three times its bulk of water, and let plate lie in it covered over half an hour or more if necessary, until full development is attained; then wash, and proceed as directed under head of developer

23.—EIKONOGEN AND HYDROCHINON DEVELOPER (FOR CARBUTT'S ORTHOCHROMATIC PLATES, "CELLULOID" FILMS AND TRANSPARENCIES).

A.

Metric Weight.		Avoirdupois Weight.
600 C.c.	Distilled water	20 ounces
120 Gm.	Sulphite of soda crystals	4 ounces
22 Gm.	Eikonogen	330 gr.
10½ Gm.	Hydrochinon	160 gr.
960 C.c.	Water to make up to	32 ounces

B.

Metric Weight.		Avoirdupois Weight.
600 C.c.	Distilled water	20 ounces
60 Gm.	Carbonate of Potash	2 ounces
60 Gm.	Carbonate soda crystals	2 ounces
960 C.c.	Water to make up to	32 ounces

Developer.—For instantaneous exposures, take (30 C.c.) 1 ounce A, (30 C.c.) 1 ounce B, (120 C.c.) 4 ounces water; for portraits, take (30 C.c.) 1 ounce A, (30 C.c.) 1 ounce B, (150 C.c.) 5 ounces water; for landscapes, full exposures, sens. 20-27, take (30 C.c.) 1 ounce A, (15 C.c.) ½ ounce B, (90 C.c.) 3 ounces water; for landscapes, full exposures, sens. 16-20, take

(30 C.c.) 1 ounce A, (25 C.c.) ¾ ounce B, (120 C.c.) 4 ounces water; for lantern slides, full exposures, take (30 C.c.) 1 ounce A, (25 C.c.) ¾ ounce B, (120 C.c.) 4 ounces water, and 2 to 6 drops Restrainer (Solution 3 in Formula No. 22) to each ounce of developer.

NOTE.—More of A will increase density, more of B will increase detail and softness. Temperature of developer should not vary much below 65 degs. nor above 75 degs. The after-treatment is the same as with any other developer.

24.—CARBUTT'S NEW ACID FIXING AND CLEARING BATH.

4 C.c.	Sulphuric acid	1 fluid drachm
480 Gm.	Hyposulphite of soda	16 ounces
60 Gm.	Sulphite of soda	2 ounces
30 Gm.	*Chrome alum	1 ounce
1920 C.c.	Warm water	64 ounces

Dissolve the hyposulphite of soda in 48 ounces (1440 C.c.) of water, the sulphite of soda in 6 ounces (180 C.c.) of water, mix the sulphuric acid with 2 ounces (60 C.c.) of water, and pour slowly into the sulphite soda solution, and add to the hyposulphite; then dissolve the chrome alum in 8 ounces (240 C.c.) of water and add to the bulk of solution, and the bath is ready. This fixing bath will not discolor until after long usage, and both clears up the shadows of the negative and hardens the film at the same time.

After negative is cleared of all appearance of silver bromide, wash in running water for not less than half an hour to free from any trace of hypo solution. Swab the surface with wad of wet cotton, rinse, and place in rack to dry spontaneously.

25.—CARBUTT'S CLEARING SOLUTION TO REMOVE YELLOW STAIN CAUSED BY DEVELOPER.

600 C.c.	Water	20 ounces
90 Gm.	Sulphate of iron	3 ounces
30 C.c.	Sulphuric acid	1 ounce
30 Gm.	Alum	1 ounce

If, after developing and fixing your negative, it is found to be stained yellow from the pyro or hydrochinon developer, first wash well to remove all hyposulphite, then immerse in above solution until the stain is removed; again wash well, and dry.

N. B.—It will improve lantern slides to immerse them for a few minutes in the clearing solution after being well freed from hyposulphite.

26.—CARBUTT'S INTENSIFYING SOLUTION.

Intensification.—With correct exposure and development, intensification need never be resorted to. The following formula is, however, very effective, and the most permanent of all methods:

No. 1.

16 Gm.	Bichlor. mercury	240 gr.
16 Gm.	Chloride ammonium	240 gr.
600 C.c.	Distilled water	20 ounces

No. 2.

16 Gm.	Chloride ammonium	240 gr.
600 C.c.	Water	20 ounces

* N. B.—During cold weather use only half the quantity of chrome alum in above.

No. 3.—*Cyanide-Silver Solution.*

180 C.c.	Distilled water	6 ounces
4 Gm.	Cyanide potass., C. P................	60 gr.
60 C c.	Distilled water	2 ounces
4 Gm.	Nitrate of silver....................	60 gr.

Pour the silver into the cyanide solution while stirring, and mark bottle *poison.*

Let the plate to be intensified wash for at least half an hour, then lay in a 5 per cent. solution of alum for ten minutes, and again wash thoroughly; this is to insure the perfect elimination of the hypo. The least trace of yellowness after intensifying shows that the washing was not sufficient.

Flow sufficient of No. 1 over the negative to cover it, and allow to either partially or entirely whiten; *the longer it is allowed to act*, the *more intense* will be the result; pour off into the sink, rinse, and flow over No. 2, and allow to act one minute; wash off, and pour over or immerse in No. 3 until changed entirely to a dark brown or black. No. 3 can be returned to its bottle, but Nos. 1 and 2 had better be thrown away. Wash thorougly and dry.

27.—Wuestner's Developers for New Eagle Lightning, New Orthochromatic and Imperial Non-Halation Plates.

Developing Formula.—These plates can be successfully worked with any good developer. For producing the finest negatives, with shortest possible exposure, we recommend the following "sal soda" developer:

No. 1. *Pyro Stock Solution.*

Water..	84 ounces
Sulphite soda crystals..........................	16 ounces
Pyrogallic acid.................................	2 ounces
Sulphuric acid, C. P	10 drops

No. 2. *Soda Stock Solution.*

Water..	84 ounces
Sal soda (crystals).............................	8 ounces

Developer.—Take 2 ounces of No. 1, and 2 ounces of No. 2, and add 8 ounces of water.

This developer may be used repeatedly as long as it remains clear. but will work slower and with more intensity when old. Therefore the fresh developer is best for short exposures, and the old is better if the plate has been full timed. In using the sal soda developer, *it is very important, to carry the development far enough, until the lights have sufficient intensity when examining the plate by transmitted light.*

Over-exposure is corrected by adding to each ounce of developer from 2 to 4 drops of the following solution: Bromide of ammonium, 1 ounce to 10 ounces of water; or by putting the plate into a weak solution of bromide of ammonium (1 to 50 water), before the development has proceeded too far, and then returning it to the developer, to gain sufficient intensity.

If under-exposure is noticed, take the plate out of developer, and, without draining, put into "soda solution"; sufficient developer will remain in the film to develop the shadows, the lights being prevented from gaining too much density in this way.

28.—Wuestner's Eikonogen Developer for Portraits and Landscapes.

No. 1.

2400 C.c.	Distilled or ice water..............	80 ounces
105 Gm.	Sulphite of soda (crystals)..........	3½ ounces
4 Gm.	Oxalic acid	1 drachm
75 Gm.	Eikonogen..	2½ ounces
15 Gm.	Yellow prussiate of potash	½ ounce

No. 2.

600 C.c.	Distilled or ice water	20 ounces
60 Gm.	Carbonate of potash	2 ounces

Developer.—Take 4 ounces of No. 1 and ½ ounce of No. 2.

For instantaneous exposures, we recommend the following eikonogen developer:

Dissolve in

300 C.c.	Distilled or ice water	10 ounces
20 Gm.	Sulphite of soda crystals	⅔ ounce
10 Gm.	Carbonate of potash	⅓ ounce

And then add

10 Gm.	Eikonogen	⅓ ounce

Fixing Bath.

Water	100 parts
Sulphite soda (crystals)	5 parts
Sulphuric acid, C. P.	1 part

And add

Hyposulphite of soda	20 parts

This fixing bath cannot be excelled; you will always get a clear and brilliant negative, no yellow stains, a good printing color, and the plate will fix in considerably less time.

After fixing, place the negative in a dish containing a 10 per cent. chrome alum solution; let it remain a few minutes to harden the film, then wash thoroughly.

In tropical climates, we recommend putting the plates in the alum solution before fixing.

29.—Wuestner's Amidol Developer.

1000 C.c.	Water	34 ounces
60 Gm.	Sulphite of soda (crystals)	2 ounces
1 Gm.	Bromide of ammonium	15 gr.

Dissolve, and add 4 to 6 grains (from 1 to 1½ drachms) amidol just before using.

For instantaneous exposures, take double the quantity of sulphite of soda (crystals) 120 grammes (4 ounces).

It is advisable to put this developer up in small quantities.

30.—Direction for Working the Cramer Plate.

Eikonogen Developer.

No. 1.

Metric Weights and Measures.		Troy Weight.
1200 C.c.	Distilled water } Hydrometer	40 ounces
60 Gm.	Sulphite of sodium crystals } test 15.	2 ounces
30 Gm.	Eikonogen	1 ounce

Boil for a few minutes. After cooling, pour into a bottle and keep it well stoppered.

No. 2.

300 C.c.	Water	10 ounces
30 Gm.	Carbonate of potassium	1 ounce

For Use.

90 C.c.	Solution No. 1	3 ounces
30 C.c.	Solution No. 2	1 ounce

In hot weather, dilute with an equal quantity of cold water. This developer can be used repeatedly by occasionally adding more of Solution No. 1 and 2.

To obtain thin negatives, full of detail, such as are required for printing on Aristo Paper, use the developer more diluted.

For negatives of greater density, add to solution No. 1:

4 Gm.	Hydrochinon	60 grains

Pyro Developer.

Alkaline Solution.

1800 C.c.	Water	60 ounces
150 Gm.	Carbonate of sodium crystals (sal soda)	5 ounces
300 Gm.	Sulphite of sodium crystals	10 ounces

A smaller quantity of sulphite will produce a warmer tone, a larger quantity a gray or bluish-black tone.

The alkaline solution must be kept in well-stoppered bottles.

If the negatives show yellow stain, make a fresh solution, or try another lot of sulphite of sodium.

Pyro Solution.

180 C.c.	Distilled or pure ice water	6 ounces
1 C.c.	Sulphuric acid	15 minims
4 Gm.	Sulphite of sodium crystals	1 drachm
30 Gm.	Pyrogallic acid	1 ounce

All pyro solutions work best while fresh.

8 grains dry pyro may be substituted for 1 drachm of this solution.

Mix in the following proportions:

10 C.c.	Pyro solution	1 drachm
80 C.c.	Alkaline solution	1 ounce
160 C.c.	Tepid water (for winter use)	2 ounces
	or,	
240 to 400 C.c.	Cold water (for summer use)	3 to 5 ounces

Fixing Bath.—The negatives may be fixed in a plain hypo bath, 1 part hyposulphite of soda to 4 parts of water; but the following bath is especially recommended.

Prepare two solutions.

No. 1.

1 kilo	Hyposulphite of soda	32 ounces
3 liter	Water	3 quarts=102 fluid ounces

No. 2.

1 liter	Water	1 quart=34 fluid ounces
15 C.c.	Sulphuric acid	½ ounce
120 Gm.	Sulphite of sodium crystals	4 ounces
90 Gm.	Chrome alum	3 ounces

After the ingredients are dissolved, pour No. 2 solution into No. 1.

During the cold season, one-half the quantity of No. 2 is sufficient.

Cramer's Isochromatic Plates are developed and fixed with the same solutions.

31.—Potash Developer for "Harvard" Dry-Plates.

A.—	Distilled water	12 ounces
	Sulphite of soda (crystals)	2 ounces
	Citric acid	60 gr.
	Bromide of ammonium	25 gr.
	Pyrogallic acid	1 ounce

Dissolve separately, mix in order named and filter.

B.—	Distilled water	12 ounces
	Sulphite of soda (crystals)	2 ounces
	Carbonate of potash	4 ounces

Dissolve separately, mix and filter.

The stock solutions must be kept in well stoppered bottles. The pyro stock solution will remain clear and in good order for about a month. It should not be used after it has turned dark and muddy from age.

To develop, mix A, 1 drachm; B, 1 drachm; water, 2 ounces. For detail, add more water; for contrast, more A; for density, more of each, A and B. For instantaneous or short exposures, use double the quantity of water (4 ounces) to begin with; pour off when about half developed, and finish with developer, full strength.

After development, and before fixing, it is well to flow the negative with a saturated solution of alum. Rinse, and fix in the following solution :

Hyposulphite of soda	16 ounces
Water	32 fluid ounces

Many prefer to add alum to the fixing solution (about 1 ounce to the above), to which there is no serious objection, provided, always, it is filtered occasionally.

THE "SEED" PLATE.

32.—Pyro Developer.

No. 1.

Pyrogallic acid	1 ounce
Sulphite of soda (crystals)	4 ounces
Water, distilled or good well water	16 ounces

No. 2.

Sal soda	4 ounces
Water	16 ounces

To develop, take

No. 1	1 ounce
No. 2	1 ounce
Water	8 ounces

In warm weather, use more water; in cold weather, less.

Where Aristo Paper is used, the negative must be much thinner and fuller of detail than is required for albumen paper; therefore, take

No. 1	1 ounce
No. 2	1½ ounces
Water	10 ounces

33.—Pyro Developer by Use of Hydrometer.

Make stock solution of sulphite of soda to test 60 with hydrometer; allow to settle perfectly clear, then take

Sulphite of soda solution	16 ounces
Pyro	1 ounce
Sulphuric acid	10 drops

(Or oxalic acid, 10 gr.)

No. 2.

Sal soda solution, hydrometer test 40.

To develop, take

Water	8 ounces
No. 1	1 ounce
No. 2	1 ounce

In warm weather, use more water; in cold weather, less.

Where Aristo Paper is used, the negative must be much thinner and fuller of detail than is required for albumen paper; therefore, take

No. 1	1 ounce
No. 2	1½ ounces
Water	10 ounces

34.—Eikonogen Developer—No. I.

No. 1.

Sulphite of soda (crystals)	3 ounces
Hot water	45 ounces

Thoroughly dissolve, then add

Eikonogen	1 ounce

No. 2.

Sal soda (Or carb. of potassium, 1¼ ounces.)	4 ounces
Water	15 ounces

To develop, take of

No. 1	3 ounces
No. 2	1 ounce

Fixing Bath.

Alum	¼ ounce
Hyposulphite of soda	5 ounces
Water	16 ounces

35.—EIKONOGEN DEVELOPER. (In one solution, for instantaneous work.)

Eikonogen	120 grains
Crystallized sulphite of sodium	1½ ounces

Dissolve in 8 ounces of hot water and add carbonate of potassium 120 grains.

For use, dilute with an equal bulk of water, and add a few drops of a 10 per cent. solution of bromide of potassium.

36.—PARA-AMIDOPHENOL DEVELOPER.

Para-amidophenol hydrochlorate	150 gr.
Sulphite sodium in crystals (Andresen's)	1½ ounces
Potassium carbonate	1½ drachms
Water	32 ounces

May be diluted in the proportion of from 1:8 to 1:12.

37.—RODINAL.

Metabisulphite of potassium	30 Gm.
Para-amidophenol hydrochlorate	10 Gm.
Potassium hydrate	To neutralization
Water	100 Gm.

This developer permits to be diluted in the proportion of 1:40.

38.—METOL DEVELOPER (HAUFF).

Solution A.

Water	100 parts
Metol	1 part
Soda sulphite	10 parts

Solution B.

Water	100 parts
Carbonate potash	10 parts
Crystallized carbonate soda	20 parts

For use, three parts A to one of B, with 40 minims of bromide of potassium solution (1 : 10).

39.—METOL DEVELOPER (ANDRESEN).

One Solution.

Water	1 quart
Metol	¾ ounce
Sulphite of soda	7 ounces
Carbonate of potash	3½ ounces
Bromide of potassium	$\frac{1}{10}$ ounce

Two Solution.

A.—	Water	1 quart
	Metol	¾ ounce
	Sulphite of soda	7 ounces
B.—	Water	3 quarts
	Carbonate of soda	7 ounces

Of these, one part of A is mixed with three parts of water for use, bromide of potassium being added as required for the prevention of fogging.

40.—AMIDOL DEVELOPER.

Dissolve 10 ounces of neutral sodium sulphite in crystals (Andresen's) in 50 ounces of distilled water, and add 1 ounce of amidol. Dissolve, filter quickly, and fill up in small bottles.

For use, dilute with from 2 to 4 volumes of water.

Do not spare bromide of potassium.

41.—DR. STOLZE'S AMIDOL DEVELOPER.

A.—Distilled water ....100 Gm.
Potassium metabisulphite .... 25 Gm.
Amidol (Andresen's).............................. 5 Gm.

B.—Distilled water .. ..100 Gm.
Potassium bicarbonate .. .. 20 Gm.

To 100 C.c. of water add 10 C.c. of A, and of B from 5 to 50 C.c., according to time of exposure. For normal exposures, 20 C.c. are sufficient.

Do not apply the solution till effervescence has ceased.

42.—CRYSTALLOS.

Sodium sulphite cryst	8	ounces
Ferrocyanide potassium	2½	ounces
Hydrochinon	1½	ounces
Caustic potash solution (75 per cent)	2	ounces
Distilled water	28	ounces

Dissolve the first three substances in 20 ounces of water, then add the caustic potash solution, finally, the rest of the water. The Paris crystallos is tinted red with aniline dye, which serves to destroy the action of light while developing.

Dilute the solution with from 1 to 5 and 8 volumes of water.

43.—GLYCIN DEVELOPER.

Sodium sulphite	40 grains
Glycin	20 grains
Potassium carbonate	80 grains
Water	4 ounces

44.—POTASH DEVELOPER FOR GELATINE DRY-PLATES (DR. STOLZE'S).

Modified by Dr. Eder.

A.—Carbonate of potassium .... 90 Gm.
Sulphite of sodium, cryst......................... 25 Gm.
Water ....200 C.c.

B.—Water .... 100 C.c.
Sulphite of sodium, cryst..................... .... 25 Gm.
Pyrogallol .... 12 Gm.

Mix 40 minims of A with 50 minims of B and 100 C.c. of water.

Bromide of potassium should be used only in minimal quantities, 1 to 3 minims (of a 10 per cent. solution); with more, the general sensitiveness is much reduced.

An alum bath mixed with an equal volume of saturated sulphate of iron solution increases the density, and gives the plate a good printing quality.

45.—SODA DEVELOPER IN ONE SOLUTION FOR GELATINE DRY-PLATES (EDER'S FORMULA).

Crystallized sulphite of sodium	5	drachms
Carbonate of sodium	2½	drachms

Dissolve in 2 ounces of boiled distilled water, and, after having cooled down, add 46 grains of pyro. Keep in well-stoppered bottles, and for use dilute with five times its bulk of water.

46.—FERROUS-OXALATE DEVELOPER FOR GELATINE DRY-PLATES (DR. EDER'S).

A.—Neutral oxalate potassium.......................200 Gm.
Distilled water ....800 C.c.

Acidulate with oxalic acid.

B.—Protosulphate of iron, cryst....... ....100 Gm.
Distilled water .... 300 C.c.
Sulphuric acid.................................. 5 minims

C.—Bromide of potassium	10 Gm.
Distilled water	100 C.c.
D.—Hyposulphite of sodium	2 Gm.
Distilled water	200 C.c.

Mix immediately before use 3 volumes of A with 1 volume of B, and develop. Restrain with a few drops of C.

For over-exposure, take less of the iron solution and add gradually in small portions, as required. To give the negative body, use C.

To make soft negatives with fine detail, take of

A	250 C.c.
B	50 C.c.
C	40 minims
D	16 minims

Plates giving with ordinary developer hard and glassy negatives, give with this modification, very satisfactory results.

47.—Pyro Developer, with Ammonia.

A.—Bromide ammonium	¼ ounce
Water	8 ounces
B.—Stronger ammonia (0.900)	1 ounce
Water	7 ounces
C.—Pyrogallol	1 drachm
Nitric acid	5 minims
Water	12 ounces

Take for correct exposure of A 40 minims, of B 20 minims, of C ½ ounce, and 2 ounces of water.

48.—Pyro Developer, with Carbonate of Sodium.

A.—Dissolve 2 ounces of granulated sulphite of sodium and ¼ ounce of meta-bisulphite of potassium in 32 ounces of distilled water, and add 1 ounce of pyrogallic acid.

Keep in well-stoppered bottles.

B.—Dissolve 8 ounces of granulated, or 16 ounces of crystallized, carbonate of sodium (common washing soda), in water enough to make a bulk of 32 ounces.

Mix 1 ounce of water with 1 drachm of A, add a few drops of B, and increase gradually till development proceeds regularly. If necessary, restrain with 10 per cent. solution of bromide of potassium.

49.—Pyro Developer, with Carbonate of Potassium.

A.—Pyro	1 ounce
Sulphite of sodium, granulated	2 ounces
Bromide of potassium	80 gr.
Citric acid	60 gr.
Water	12 ounces
B.—Water	12 ounces
Sulphite of sodium, granulated	1 ounce
Carbonate of potash	3 ounces

1 drachm of each—A and B—to 1 ounce of water, make the developing solution.

50.—Hydrochinon Developer.

A.—Hydrochinon	¼ ounce
Sulphite of sodium, granulated	1 ounce
Meta-bisulphate of potassium	30 gr.
Water	16 ounces
B.—Carbonate of potassium	1½ ounces
Water	16 ounces

51.—Hydrochinon Developer in One Solution.

Hydrochinon	½ ounce
Sodium sulphite, granulated	2 ounces
Potassium carbonate	2 ounces
Water	32 ounces

For use, dilute 1 volume with 3 volumes of water.

52.—The Acid Fixing and Clearing Bath.

Add 2 ounces of S. P. C. Clarifier (acid bisulphite of sodium) solution to 1 quart of hypo solution 1 in 5.

53.—Combined Alum and Hypo Bath.

Add saturated solution of sulphite of sodium to saturated solution of alum till the white precipitate formed remains undissolved, and when the odor of sulphurous acid becomes perceptible.

Mix this solution with an equal bulk of freshly-prepared hypo solution 1 in 5, and filter.

This bath will remain clear.

54.—Clearing Solution (Edward's).

Alum	1 ounce avoirdupois
Citric acid	1 ounce "
Sulphate of iron, crystals	3 ounces "
Water	1 Imperial pint

This should be freshly mixed.

55.—Clearing Solution.

Saturated solution of alum	20 ounces
Hydrochloric acid	1 ounce

Immerse negative after fixing and washing. Wash well after removal.

56.—Belitzki's Method for Removing the Last Traces of Hypo.

Chloride of Lime	20 Gm.
Water	1 liter

Add to the milky liquid

Sulphate of zinc	40 Gm.

dissolved in from 80 to 100 C.c. of water; shake well and decant.

The clear, supernatant solution of hypochlorite of zinc is kept in well-closed bottles; 1 part of it mixed with 60 parts of water will remove the last traces of fixing soda.

The solution remains active as long as it smells of hypochlorous acid.

57.—To Remove Hypo from Films.

A solution of bromine in water, about 1 in 30, destroys the hypo in a gelatine film.

58.—Intensifier, with Mercury and Ammonia, for Gelatine Dry-Plates.

Pour over the well-washed negative a saturated solution of mercuric chloride (bichloride of mercury); do not keep it on too long, unless the negative is very thin. Wash well, and immerse in bath of

Water	10 ounces
Ammonia	10 minims

Leave the plate in this solution until the black color goes quite through the film. Wash well.

59.—Intensifier (Mercuric) with Sodium Sulphite, for Gelatine Dry-Plates.

Whiten the negative in the saturated solution of mercuric chloride, wash and blacken with a solution of sulphite of sodium 1 in 5. Wash well.

The reduction is perfect, with a positive black tone.

60.—Intensifier with Iodide of Mercury.

Dissolve 1 drachm of bichloride of mercury in 7 ounces of water and 3 drachms of iodide of potassium in 3 ounces of water, and pour the iodide solution into the mercury till the red precipitate formed is completely dissolved.

For use, dilute with water, flow over the negative till the proper density is reached, and wash, when the deposit will turn yellow. Remove the yellow color by flowing a 5 per cent. solution of hypo over the plate, and give it the final washing.

61.—Intensifier for Gelatine Dry-Plates with Mercuric Chloride and Hydrochinon (Dr. Mallman).

After whitening in the saturated solution of mercuric chloride, as usual, treat with an old hydrochinon developer; the result is a bluish-black intensification, which is applicable to positives as well as negatives.

62.—Reducer for Gelatine Dry-Plate Negatives (Farmer's).

Sat. sol. of ferricyanide of potassium	1 part
Hyposulphite of sodium solution, 1 in 10	10 parts

63.—Reducer for Gelatine Dry-Plates.

Perchloride of iron	30 gr.
Citric acid	60 gr.
Water	1 pint

64.—Belitski's Acid Ferric-Oxalate Reducer for Gelatine Plates.

Water	7	ounces
Potassium ferric oxalate	2½	drachms
Crystallized neutral sulphite of sodium	2	drachms
Powdered oxalic acid, from	30 to 45	gr.
Hyposulphite of soda	1½	ounces

The solution must be made in this order, filtered, and be kept in tightly-closed bottles; and as under the influence of light the ferric salt is reduced to ferrous, the preparation must be kept in subdued light, in non-actinic glass bottles.

65.—To Reduce Intensity of Negatives.

Rub the parts to be reduced with a soft rag moistened with alcohol, till the density is softened down. For sharply defined outlines, use a pointed stick of soft wood dipped in alcohol.

The method may be well applied for the brightening up of flare spots and halation marks.

ORTHOCHROMATIC METHODS BY BATHING.

66.—Orthochromatic Dry-Plates—F. Ives' Chlorophyll and Eosine Process.

Use any good bromide collodion emulsion that contains no free nitrate of silver. Flow plate as usual, and as soon as the emulsion film sets, flow several times with strong alcoholic solution of chlorophyll from blue myrtle, or plantain leaves; then immerse in water strongly tinted with blue shade eosine, and keep in motion until smooth.

Sensitizes for all colors, including deep ruby red; a very light-yellow screen is sufficient to secure correct rendering of color-tone.

67.—ORTHOCHROMATIC DRY-PLATES—V. SCHUMANN'S CYANINE BATH.

Soak the plate in 200 C.c. of water and 2 to 4 C.c. of stronger ammonia for two or three minutes, then immerse in

Distilled water	200 C.c.
Alcohol	10 C.c.
Stronger ammonia (0.900)	4 C.c.
Alcoholic solution of cyanine, 1 in 500	10 C.c.

68.—ORTHOCHROMATIC DRY-PLATES—ERYTHROSINE BATH (MALLMANN AND SCOLIK).

Preliminary Bath.

A.—Water	200 C.c.
Stronger ammonia	2 C.c.

Soak the plate for two minutes.

Color Bath.

Erythrosine solution, 1 in 1000	25 C.c.
Stronger ammonia (0.900)	4 C.c.
Water	175 C.c.

The plate should not remain longer in this bath than one and a quarter minutes.

69.—OBERNETTER'S METHOD WITH NITRATE OF SILVER.

Distilled water	480	C.c. =	16	fluid ounces
Nitrate of silver	1.25	Gr. =	20	gr.
Ammonium carbonate	5	Gr. =	75	gr.
Erythrosine solution (1 in 500)	35	C.c. =	1⅛	fluid ounces
Stronger ammonia (0.900)	4	C.c. =	1	drachm

Bathe the plate in the preliminary solution (see No. 68) for 150 seconds. Without washing flow the sensitizing solution over the plate twice, and dry in the dark closet.

70.—TO PREPARE YELLOW GLASS SCREENS.

Take of crushed (not powdered) curcuma root, 2 ounces, and macerate in 10 ounces of alcohol for three days. After filtering the tincture, mix with an equal bulk of ether, and add to each ounce of the mixture 6 grains of gun cotton.

With this collodion coat a plane parallel glass plate, which must be perfectly white, thin, and without any curvature.

VARNISHES.

71.—NEGATIVE VARNISHES.

Sandarac	4 ounces
Alcohol	24 ounces
Oil of lavender	3 ounces
Chloroform	5 drachms

72.—NEGATIVE VARNISH.

White hard shellac varnish	15 ounces
Alcohol	25 ounces

This will be found a good and cheap varnish if durability is not required, as it is easily rubbed up for retouching upon and easily cleaned off. Very suitable for enlarged negatives that are not to be retained.

73.—NEGATIVE VARNISH.

Tough, hard and durable.

Shellac	$1\frac{1}{4}$ ounces
Mastic	$\frac{1}{4}$ ounce
Oil of turpentine	$\frac{1}{4}$ ounce
Sandarac	$2\frac{1}{4}$ ounces
Venice turpentine	$\frac{1}{4}$ ounce
Camphor	20 gr.
Alcohol	20 fluid ounces

74.—NEGATIVE VARNISH.

Sandarac	90 ounces
Venice turpentine	36 ounces
Oil of lavender	10 ounces
Alcohol	500 fluid ounces

75.—STANDARD PHOTOGRAPHIC VARNISH.

White shellac	8 ounces
Orange shellac	4 ounces
Sandarac	1 ounce
Alcohol	60 fluid ounces

76.—RETOUCHING MEDIUM.

Dammar	70 gr.
Yellow resin	6 drachms
Oil of turpentine	4 ounces

77.—NEGATIVE RETOUCHING VARNISH.

Sandarac	1 ounce
Castor oil	80 gr.
Alcohol	6 fluid ounces

First dissolve the sandarac in the alcohol, and then add the oil.

78.—GROUND-GLASS VARNISH.

Sandarac	90 gr.
Mastic	20 gr.
Ether	2 fluid ounces
Benzol	$\frac{1}{2}$ to $1\frac{1}{2}$ fluid ounces

The proportion of the benzole added determines the nature of the mat obtained.

79.—ENCAUSTIC PASTE.

Pure white wax	500 parts
Elemi	10 parts
Benzol	200 parts
Oil of lavender	300 parts
Oil of spike	15 parts

PRINTING AND TONING ON ALBUMENIZED, PLAIN AND OTHER PAPERS.

80.—THE SILVER PRINTING BATH.

Silver nitrate	50 gr.
Water	1 ounce

Neutralize with carbonate of silver.

81.—MODIFIED SILVER BATH.

Silver nitrate	50 gr.
Ammonium nitrate or magnesium nitrate	50 gr.

To secure a neutral state of the bath, a little carbonate of silver should be kept at the bottom of the stock bottle.

By PH. VON SCHOELLER.

PORTRAIT.

82.—THE PRICE TONING FORMULA.

Into 7½ ounces of water dissolve 15 grains chloride of gold and sodinm, then add to it 300 grains of acetate of soda and 7 drops of a saturated solution of chloride of lime.

This stock solution should be prepared at least twenty-four hours before being used. Take ½ ounce of it and mix with 5 ounces of water.

83.—THE PHOTOGRAPHIC TIMES TONING BATH.

Into 7½ ounces of water put 7½ grains chloride of gold and sodium. Label the bottle containing the mixture: *Chloride of gold solution.* Combine 6 ounces of water with 1 ounce *of French azotate,* to which add 1½ ounces of the chloride of gold solution.

84.—BORAX TONING BATH.

Chloride of gold solution, 1:50	3 C.c.
Borax solution, 1 to 10	100 C.c.
Water	100 C.c.

Can be used immediately.

85.—CHARLES W. HEARN'S TONING BATHS.

With Sal Soda.

Distilled water	64 fluid ounces
Acid sol. of chloride of gold (4 grains to 1 ounce)	1 fluid ounce
Saturated solution of carbonate of sodium cryst.	½ fluid ounce

Should be prepared half an hour before use.

With Chloride of Lime.

Water	40 ounces
Chloride of lime	5 gr.
Chloride of gold	4 gr.

86.—ABNEY AND ROBINSON'S TONING BATHS.

Chloride of gold	1 gr.
Sodium carbonate	10 gr.
Water	10 ounces

Should be used immediately after mixing. This bath gives purple and black tones.

87.—WITH CHALK AND CHLORIDE OF LIME.

Chloride of gold	2 gr.
Saturated sol. of chloride of lime	2 drops
Chalk	1 pinch
Water	16 ounces

The bath should be prepared with hot water, and be kept for one day before using it.

88.—DR. LIESEGANG'S TONING BATH.

With Tungstate of Sodium.

Tungstate of sodium	20 Gm.
Boiling water	1 liter
Chloride of gold	1 Gm.

89.—DR. LIESEGANG'S TONING BATH.

With Phosphate of Sodium.

Phosphate of sodium	15 Gm.
Chloride of gold	1 Gm.
Water	1 liter

90.—Dr. Liesegang's Toning Bath.

With Carbonate of Lime (Chalk).

Chloride of gold	1 Gm.
Carbonate of sodium	15 Gm.
Chalk	5 Gm.
Water	1 liter

After twelve hours the bath is perfectly clear and colorless, when it is ready for use. It is very durable, and gives fine tones.

91.—Toning Bath for Ready Sensitized Paper.

A.—Chloride of gold	1 Gm.
Water	1 liter
B.—Borax	10 Gm.
Tungstate of sodium	40 Gm.
Water	1 liter

92.—Printing on Plain Paper.

Prepare the plain paper with

Ammonium chloride	60 to 80 gr.
Sodium citrate	100 gr.
Sodium chloride	20 to 30 gr.
Gelatine	10 gr.
Distilled water	10 ounces

or,

Ammonium chloride	100 gr.
Gelatine	10 gr.
Water	10 ounces

The gelatine is first swelled in cold water and then dissolved in hot water, and the remaining components of the formula are added. The solution is filtered, and when still warm the paper floated upon it for three minutes.

The salted paper is sensitized upon a neutral 45-grain silver bath.

93.—Red Prints for Photo-Engravers.

Citric acid	100 gr.
Ammonium chloride	100 gr.
Gelatine	10 gr.
Water	10 ounces

Dissolve the citric acid in a small portion of water, and exactly neutralize with carbonate of soda (228 grains of common washing soda are required).

Float the paper on this bath for one to two minutes, and sensitize upon a 50-grain nitrate of silver solution. Fix in fresh hypo, without toning.

94.—Platinum Toning Bath, for Plain Silver Prints.

Chloroplatinite of potassium	1 Gm.
Water	1 liter
Nitric acid	5 to 10 drops

95.—Toning Silver Prints After Fixing (Pizzighelli).

Ammonium sulphocyanate	300 Gm.
Gold chloride	3 Gm.
Potassium hydrate	3 Gm.
Water	1000 Gm.

96.—How to Print on Whatman's Drawing Paper.

Salt the paper in

Water	560 Gm.
Arrowroot (boiled)	18 Gm.
Ammonium chloride	16 Gm.

by floating. Dry in horizontal position, and sensitize with a

Silver nitrate solution..........60 Gm. to 240 Gm. of water

to which

Citric acid......................25 Gm. in 240 Gm. of water

is added.

Print till a metallic lustre appears in the deeper shadows.

Tone with

Chloroplatinite of potassium	4 Gm.
Water	560 Gm.
Nitric acid	1 to 2 Gm.

Fix in the ordinary hypo bath made alkaline with a few drops of ammonia.

The resulting tones are of a warm brown, when, adding sodium bisulphite to the hypo, the color will turn to a positive black.

97.—Pizzighelli's Platinum Paper.

1.—	Chloroplatinite of potassium	10 Gm.
	Distilled water	60 Gm.
2.—	Ferric oxalate	20 Gm.
	Oxalic acid	1.5 Gm.
	Water	100 Gm.
3.—	2 per cent. solution of chlorate potassium.	0.4 Gm.

For use, mix of

1	48 Gm.
2	30 Gm.
3	8 Gm.
Water	8 Gm.

The paper is coated with this solution by means of brush, sponge or cotton tuft.

Dry quickly without the application of heat, and keep the sensitive paper in a box and free from moisture.

When sufficiently exposed, develop with

Oxalate potassium	140 Gm.
Water	500 Gm.

acidified slightly with oxalic acid.

Fix in 1 part of hydrochloric acid and from 60 to 80 of water; finally wash.

The acid fixing bath should be applied three or four times successively.

When adding to the above developer from 1 to 2 Gm. of mercuric chloride, the otherwise black tone will change to an agreeable brown.

ARISTOTYPE OR CHLORIDE OF SILVER COLLODION AND CHLORIDE OF SILVER GELATINE PRINTING

98.—Aristotype, or Chloride of Silver Collodion.

A.—	Nitrate of silver	8 Gm.
	Alcohol	100 C.c.
B.—	Chloride of strontium	2 Gm.
	Alcohol	100 C.c.

C.—Citric acid	5 Gm.
	Water	100 C.c.
D.—Ether	100 C.c.
	Gun cotton	4 Gm.
	Alcohol	100 C.c.

To 100 C.c. collodion (D) add first, by constant agitation, 10 C.c. of B and 10 C.c. of C; finally add 5 C.c. of A by vigorously shaking the mixture. The resulting emulsion is allowed to settle for twenty-four hours, and is then used for coating paper.

99.—Chloride of Silver Collodion (Geldmacher's).

Solution 1.

Gun cotton	6½ fluid drachms
Ether	15 fluid ounces
Alcohol	15 fluid ounces
Castor oil	1 drachm

Solution 2.

Nitrate of silver	5 drachms 8 gr.
Water	6 drachms
Alcohol	1½ ounces

Dissolve in a warm water bath.

Solution 3.

Citric acid .... 1 drachm 15 gr.

dissolved in

Alcohol .... 2½ ounces

and

Chloride of strontium .... 1 drachm 15 gr.

dissolved in

Alcohol .... 2½ ounces

Make the two solutions separately and mix.

After all the solutions have been made, add No. 3 to No. 1, shake vigorously, and by subdued light add gradually, and in small portions at a time, the No. 2 solution by constant agitating.

After an hour's ripening, the collodion emulsion is ready for use.

The paper to be coated must be furnished with a substratum of sulphate of barium and gelatine.

100.—Woodbury's Formula for Gelatine Aristotypes.

Water	8 ounces
Silver nitrate	¼ ounce
Rochelle salts	20 gr.
Ammonium chloride	10 gr.
Alum	50 gr.
Citric acid	1 drachm
Gelatine	1 ounce

Dissolve the gelatine in 6 ounces of water, the silver nitrate and the citric acid in 1 ounce of water, and the salts and alum in another ounce of water; add latter solution to gelatine, and stir well and pour in the silver solution gradually.

101.—Liesegang's Toning Bath for Aristotypes.

A.—Water		20 ounces
	Sulphocyanate of ammonium	1 ounce
	Alum	1 ounce
	Saturated solution of carbonate of ammonium	20 drops
B.—Water		50 ounces
	Chloride of gold	15 gr.

102.—A. Stieglitz's Toning Bath for Aristotypes.

1.—Phosphate of sodium	3 drachms
Water	32 ounces
2.—Chloride of gold	15 gr.
Water	16 ounces

Mix. Allow to stand for twenty-four hours.

103.—Liesegang's Combined Toning Bath.

Water	32 ounces
Hyposulphite of sodium	8 ounces
Sulphocyanate of ammonium	1 ounce
Acetate of sodium	½ ounce
Saturated solution of alum	2 ounces

and

Water	8 ounces
Chloride of gold	15 gr.
Chloride of ammonium	30 gr.

Pour the gold solution into the hypo solution, then add 30 grains of freshly prepared chloride of silver.

104.—Combined Fixing and Toning Bath for Chloride of Silver Gelatine Paper.—Dr. F. Stolze's.

Hyposulphite of sodium	35 Gm.
Common salt	9 Gm.
Alum	4 Gm.
Sulphocyanate of ammonium	2 Gm.
Water	150 to 200 C.c.

The compound will have matured for use in four to eight days.

Decant the clear solution from the deposit formed and filter. Immediately before use, add to above quantity, 2 C.c. chloride of gold solution 1 in 100. If the solution does not act with sufficient energy, a few C.c. of saturated alum solution may be added.

105.—Ilo Collodion Paper—Separate Toning Bath.

METRIC WEIGHT.	APOTHECARIES' WEIGHT.
Stock Solution No. 1.	
2000 grammes water.	½ gallon water.
90 grammes acetate soda fused.	3 ozs. acetate soda fused.
Stock Solution No. 2.	
2000 grammes water.	½ gallon water.
30 grammes sulpho cyanide ammonia.	1 oz. sulpho cyanide ammonia.
Stock Solution No. 3.	
1 gramme chloride gold.	15 grains chloride of gold.
250 grammes water.	8 ozs. water.

Mix bath two hours before using, in the following proportions: No. 1, four parts; No. 2, one part, and No. 3, two parts.

Fix in a solution one part hypo to ten parts water.

If the tone is not what you wish, then place the toned and fixed print in an old combined bath, and you can obtain any desired effect.

Another Good Separate Toning Bath.

METRIC WEIGHT.		APOTHECARIES' WEIGHT.	
Boiling water	2000 grammes	Boiling water	½ gallon
Sulpho cyanide ammonia	75 grammes	Sulpho cyanide ammonia	2½ ounces
Citric acid	15 grammes	Citric acid	½ ounce
Alum, powdered	10 grammes	Alum, powdered	⅓ ounce
Phosphate sodium	30 grammes	Phosphate sodium	1 ounce
Chloride of gold	1 gramme	Chloride of gold	15 grains

Add two parts water to one part of this solution; it may be used one hour after mixing, when it has become cold.

Each of these Separate Baths possess good keeping qualities, and may be strengthened each time you use them by adding fresh solution.

THE ILO COMBINED BATH.

We recommend to those who prepare their own bath, to mix in a six or seven gallon stone jar (with hole near bottom to insert wooden faucet), in order following:

METRIC WEIGHT.		APOTHECARIES' WEIGHT.	
Water	16 liters	Water	4⅜ gallons
Acetate of lead, C. P	160 grammes	Acetate of lead, C. P.	5⅛ ounces
Nitrate of lead, C. P.	160 grammes	Nitrate of lead, C. P.	5⅛ ounces
Alum, powdered	120 grammes	Alum, powdered	3⅞ ounces
Sulpho cyanide ammo., C.P.	440 grammes	Sulpho cyanide ammo., C. P.	14⅛ ounces
Citric acid	120 grammes	Citric acid	3⅞ ounces
Hypo	4000 grammes	Hypo	140 ounces
Chloride of gold	6 grammes	Chloride of gold	92 grains

Dissolve thoroughly, let stand to settle and use the clear portion only.

This bath will keep any length of time, but if kept open to the air will evaporate and get stronger; it ought to be prepared in a large jar and then drawn off into bottles.

☞ The Combined Bath must *always* have a great *excess of hypo*. The hypo is constantly decomposed by the chemicals in the *paper* and in the *bath*, and this diminishes the fixing power. An exhausted bath *tones* very quickly, but fixes insufficiently, and yellow stains and green borders around vignettes are the results. Therefore, after every twenty-five cabinets toned, one-half ounce of a saturated solution of hypo must be added to the bath you are *using*.

A quart of this solution will tone 150 cabinet photos with perfect safety, and *when prints are washed previously*, 300 to 350.

It is best to use fresh bath every time, but when using old and new, always take three-quarters new, and *only one-quarter* old bath. Pour the used bath in a separate bottle.

106.—C. E. HOPKINS'S OMEGA PAPERS.

Separate Toning and Fixing for Omega Paper.—Print about the same as albumen paper. Wash through five or six changes of water, having the first two thoroughly alkali.

Have prepared the following solutions:

Borax (saturated solution)	1 to 12	ounces water
Acetate of soda (saturated solution)	1 to 3	ounces water
Hypo soda (saturated solution	1 to 1½	ounces water
Alum (saturated solution)	1 to 10	ounces water

For toning, use gold solution, 1 ounce; water 20 to 60 ounces; borax solution, to make nearly neutral; acetate of soda solution, 2 to 4 drachms.

Tone to nearly the desired tone, and place in plenty of water slightly acidified with acetic acid; rinse well, and fix from fifteen to thirty minutes in hypo solution, 9 to 12 ounces; borax solution, 3 to 6 ounces; liquid acid sulphite of soda, 1 drachm; alum solution, 10 to 20 ounces; water to make 1 gallon. The acid sulphite, added before the alum, prevents any precipitation. Time the fixing according to the depth of printing, tone, etc. If the high lights are clear and the print light enough, and the tone not too warm, take out in fifteen minutes; otherwise, leave in longer and strengthen the bath. The strength of the toning bath should be regulated to suit the strength of the paper, fresh paper toning much easier than old. Toning should occupy about ten minutes, and strength of bath regulated to that time.

Handle prints face down in all of the processes, and keep them moving; wash very thoroughly after fixing; mount, retouch and burnish in the ordinary way. For cleaning the surface of the prints after they are dry, use alcohol and a soft, clean cloth. In cool weather, and prints in ordinary condition, the smaller quantities indicated in the formula are sufficient; but more alum may be required in warm weather, in which case use more borax and hypo also. In case the high lights do not clear up in a reasonable time, the fixing bath should be strengthened.

Combined Bath for Omega Paper.

Hot water	1 gallon
Hypo soda	12 ounces
Borax	1 ounce
Alum	4 ounces

Dissolve thoroughly; place in evaporating dish; heat to near the boiling point (180 degs.); let cool, and filter. For use, to each 32 ounces add 1 drachm of an 8-grain solution acetate of lead, and 1 grain of gold. This ought to tone in about ten to fifteen minutes. If it should tone more rapidly than ten, add more of the stock solution; but if more slowly than fifteen, add a little more gold. Do not wash the prints previous to toning, but place them dry into the bath, one at a time, being careful to manipulate them briskly, and break all air bubbles. Do not place too many prints in the bath at once, and do not try to tone too many in a given quantity of solution. One quart of the bath will tone and fix from forty to fifty cabinets. Do not try more. Throw this away and use fresh. Should the film become soft, rinse through two or three changes of water, and soak them a few minutes in a plain bath of alum, about 4 ounces to the gallon. It is surprising what beautiful tones may be produced by this process—no indication of that "double tone" so common in combined baths. Stop the tone very nearly where you want it, as there is very little change in drying. If there is any inclination to stick to the rubbing-down paper, use a soft, wet sponge.

107.—Combined Toning and Fixing Bath (Ehrmann's).

Dissolve

Hyposulphite of soda	16 ounces

in

Water	31 ounces

Also dissolve

Alum	3 ounces

in

Water	31 ounces

Mix the two solutions and allow to stand for several days in an open jar or vessel till all sulphurous acid has evaporated. Then filter, and add 22 grains of nitrate of lead previously dissolved in water.

To 18 ounces of this solution add 5 grains of pure terchloride of gold dissolved in 2 ounces of water.

The gold solution should be added in small portions at a time, by constant stirring with a glass rod.

Twenty ounces of this bath will tone fifty 5 x 8s of any kind of aristo (chloride of silver emulsion) prints, but not more.

The best results were had upon Bradfisch Improved Aristo Paper.

PRINTING ON SUBSTANCES OTHER THAN PAPER.

108.—Collodion for Porcelain Pictures.

Fennemore's Method.

A.—Negative gun cotton	60 gr.
Alcohol	2 fluid ounces
Ether	3 fluid ounces

Dissolve 120 grains nitrate of silver in 3 ounces of hot alcohol, and add by constant stirring to the above collodion.

B.—Chloride of strontium	32 gr.
Citric acid	24 gr.

Reduce to a fine powder and dissolve in 4 ounces of alcohol, add

Ether	4 fluid ounces
Gun cotton	60 gr.

The two collodions are to be mixed in equal proportions.

109. *Hern's Method.*

A.—Alcohol	7 fluid ounces
Ether	9 ounces
Gun cotton	112 gr.
B.—Nitrate of silver	486 gr.
Distilled water	1 ounce
C.—Chloride of calcium	128 gr.
Alcohol	4 fluid ounces
D.—Citric acid	128 gr.
Alcohol	4 fluid ounces

Decant 8 ounces of A, add 64 drops of B in small portions, stirring up well after every addition, and 4 drachms of C in the same way. Finally 4 drachms of D must be added in the same manner as the calcium solution.

110.—Printing on Silk.

Boiling water	80 ounces
Chloride of ammonium	100 gr.
Iceland moss	60 gr.

When nearly cold, filter and immerse the silk for fifteen minutes. Sensitize for fifteen minutes in an acid 20-grain silver bath, and when dry stretch the fabric over cardboard. Print deeper than usual and tone in

Water	20 ounces
Acetate of sodium	2 drachms
Chloride of gold	3 gr.
Common whiting	a few gr.

111.—Making Silver Prints on Wood.

Gelatine	45 gr.
White soap	45 gr.
Water	5¼ fluid ounces

Soak the gelatine in water for five or six hours, then dissolve it with the aid of a water bath. Cut the soap into small pieces, and add to the gelatine solution, stirring the whole with a glass rod to insure a perfect mixture; then add powdered alum until the froth disappears, and strain through muslin. Cover the block with this mixture and a little zinc white, then wipe off so that a very thin film will be left, rubbing it gently, so that the film may be of as even a thickness as possible. After drying, apply with a badger's-hair brush a coating of the following composition:

Albumen	3¼ fluid ounces
Water	2½ fluid ounces
Chloride of ammonium	67½ gr.
Citric acid	18¾ gr.

Whip the albumen to a froth, and allow it to settle; to the limpid portion add the water, then the sal ammonia, and carefully stir with a glass rod. then add the citric acid. When the block is dry, sensitize with a solution of

Nitrate of silver	187½ gr.
Water	3¼ fluid ounces

Pour this upon the surface of the block, spread it evenly with a glass rod and pour off the excess. When the block is dry, expose it under a negative in the usual manner, until it is printed the exact shade desired. When printed, immerse the printed surface in a very strong solution of salt for about three minutes. Then wash it under a stream of water for a short time, and fix it by placing it face downward in a saturated solution of hyposulphite of soda. After fixing, wash under a stream of water for about ten minutes; when dry, it is finished, and ready for the engraver.

112.—To Transfer Photographs upon Wood for Engraving.

Float the reverse side of sensitized albumen paper for fifteen minutes upon a 4 per cent. solution of bichromate of potassium; dry well; expose to light till the picture is fairly visible; place the print upon a glass plate under water until the unacted on bichromate is dissolved out; after removal from the water, roll in with fatty ink.

When the picture is sufficiently blackened, and nearly dry, it can be transferred upon the engraver's block by rubbing it on carefully.

113.—Cyanotype, or Blue Printing Process.

A.—Citrate of iron and ammonium	1⅞ ounces
Water	8 ounces
B.—Ferricyanide of potassium	1¼ ounces
Water	8 ounces

Mix equal parts immediately before use and float the paper, Rives' plain, upon it for three minutes; hang up to dry.

To Intensify Faint Blue Prints.—Soak them for five minutes in a solution of 1 drachm of ferric chloride in 32 ounces of water, and wash again.

Cyanotype Process—Black Lines upon a White Ground.

Water	9 ounces
Gelatine	3 drachms
Perchloride of iron solution (U. S. Ph.)	6 drachms
Tartaric acid	3 drachms
Ferric sulphate	3 drachms

Filter off any precipitate that may be found and coat any good, stout white paper with the full strength solution. Expose in sunlight till details or lines are visible, and develop with

Gallic acid	6 drachms
Alcohol	6½ ounces
Water	32 ounces

Wash well in several changes of water.

114.—To Tone Bromide of Silver Prints and Diapositives to a Warm Color.

A.—Uranium nitrate	1 Gm.
Water	100 Gm.
B.—Potassium ferricyanate	2 Gm.
Glacial acetic acid	8 Gm.
Water	100 Gm.

Mix immediately before use.

115.—Kallitype Printing (Formula No. 2).

Dissolve 15 Gm. of ferric oxalate in 500 C.c. of water, and 3 Gm. of silver nitrate in 500 C.c. of water. Mix the two solutions, and float the paper upon it for two minutes.

Print till the half shadows of the cliché are out, and develop in

Water	1000 Gm.
Rochelle salts	10 Gm.
Borax	7 Gm.
And of a saturated solution of potassium bichromate from 2 to	4 drops

The picture is thoroughly developed in fifteen minutes; afterward immerse it in diluted ammonia, 1 : 100; wash and dry.

Potassium bichromate acts here as a restrainer. Too much of it makes the print harsh and chalky, and a longer exposure is required to make a good print.

116.—THE KALLITYPE (*The Photographic Times* Formula).

Coat stout but fine grained paper with a solution of

Sodium ferric-oxalate	6 drachms
Water	2½ ounces

Dry quickly without the application of heat, and print till the deeper shadow portions of the picture become visible. On removal of the print from the frame, immerse into a 1½ per cent. solution of nitrate of silver acidified slightly with citric acid, when the picture will develop brilliantly and with all detail.

Finally wash in pure water. A yellow tinge may be washed away with a 5 per cent solution of oxalic acid.

117.—FORMULA FOR VICI (KALLITYPE) PAPER, HOPKINS'S.

Use this paper when thoroughly dry. Do not print in rainy weather expecting superior results, nor after 4 P.M. expecting black tones. This paper prints but slightly; developing is done afterward.

Print in direct sunlight until deep shadows are well indicated.

Developing may be done in weak white light.

As with Omega paper, the prints when finished will be of a darker color than they appear in the developer. There is no chance in overdeveloping, care only being required in the printing. Do not expose prints in too strong white light until after having taken out of the fixing solution.

Immerse prints one at a time in either of the following solutions, breaking any air bubbles that may appear, until the yellow of the paper entirely disappears. This takes about five minutes.

Develop as soon as possible after removing from printing frame, as they continue to print after once exposed.

Black Tones.

Water	10 ounces
Rochelle salts	1 ounce
Borax	¾ ounce

Sepia Tones.

Water	10 ounces
Rochelle salts	1 ounce
Borax	2 drachms

Dissolve cold, shake well, leave any undissolved borax in bottle, and filter.

Restraining Solution.

Bichromate of potash	20 gr.
Water	10 ounces

15 to 20 minims must be added to 10 ounces of mixed developer.

Increasing the amount of this solution in the developer adds brilliancy to the prints, and prevents flatness. Increase it for feeble negatives, decrease it for intense; excess will totally destroy half tone. As prints are taken from the developing solution, place them in clear water. When prints are all developed, remove them from the water to the fixing bath, as follows:

Water	32 ounces
Ammonia	2 drachms

Leave the prints in this bath for ten minutes, or two baths for five minutes each for large quantities.

Wash for twenty minutes, mount and dry. Prints when finished may be toned with platinum in the following bath:

Water	20 ounces
Platinum potash chloride	15 gr.
Citric acid	5 gr.

118.—Converting Blue Prints into Brown Prints.

Blue ferro-prussiate photographic prints may be converted into brown prints by the following process:

The positive blue print, thoroughly washed and dried, is plunged into a solution of ammonia, in which it is kept until it has nearly or entirely lost its color. (The operation lasts from two to four minutes.) The print is rinsed and plunged into a bath of tannic acid, the operation being stopped as soon as the desired sharpness and tone are obtained.

This last operation requires about ten minutes. If at the end of this time the color be not dark enough, it is intensified by adding to the bath a few drops of ammonia. After a lapse of one or two minutes, rinse in abundant water.

1. Solution for preparing the sensitized paper:

Tartrate of iron and potassium	15 Gm.
Red prussiate of potash	12 Gm.
Rain water	250 C.c.

2. Solution to remove the color of the print:

Stronger ammonia (0.900)	100 C.c.
Rain water	800 C.c.

3. Solution to give the brown tone:

Tannic acid	10 Gm.
Rain water	500 C.c.

Dissolve and filter.

119.—Toning Blue Prints.

Blue prints may be given the black tone by plunging them into a solution of 4 parts of potash in 100 parts of water; then, when the blue color has entirely disappeared under the action of the potash, and a yellowish color has taken its place, they are immersed in a solution of 4 parts of tannin in 100 parts of water; then, washing them again, we obtain prints whose tone may be assimilated to that of pale writing ink.

120.—Pellett's Method for Making Blue Lines upon White Ground.

The formula is composed as follows:

Gum arabic	385 gr.
Sodium chloride	46 gr.
Tartaric acid	62 gr.
Perchloride of iron	123 gr.
Water	3½ ounces

Highly sized and smooth paper is evenly coated with this mixture, dried in the dark, and exposed under a negative.

Develop with a saturated solution of ferrocyanide of potassium. Fix in a 1 to 20 solution of hydrochloric acid.

121.—Black Lines upon White Ground.

Water	9 ounces
Gelatine	3 drachms
Solution of perchloride of iron (U. S. Ph.)	6 drachms
Tartaric acid	3 drachms
Ferric sulphate	3 drachms

Dissolve, filter and apply to the surface of stout paper (Steinbach medium roll).

After exposure to light, under a diapositive or drawing immerse the print in

Gallic acid	6	drachms
Alcohol	6½	ounces
Water	32	ounces

when the greenish-yellow print will turn to inky black.

Finally wash in pure water.

USEFUL RECEIPTS.

122.—To Find the Focal Length of a Lens—W. H. Sherman's Rule.

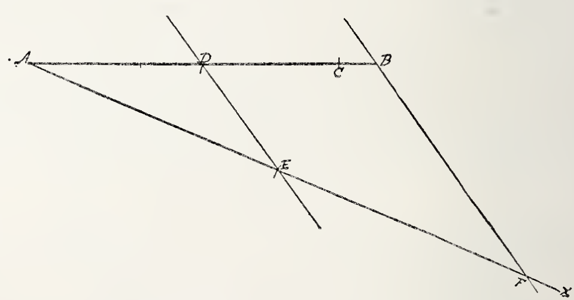
Make two images of any object of convenient length, so that the *difference* between the images will be equal to some part of the object, making the position of the ground-glass on the base of the camera where each image is in focus. The distance between the two positions of the ground-glass thus found will be the same part of the focal length that the difference of the two images is of the object.

Examples: With two images of a foot rule, let one image be 8 inches long and the other 4 inches. The difference being one-third the length of the object, the distance between the two positions of the ground-glass will be one-third of the focal length of the lens.

123.—To Calculate the Focal Fraction of Stops for Lenses.

Divide the focal length obtained by the above method expressed in inches and hundredths, by the diameter of stop opening expressed in hundredths of an inch.

124.—To Find Focal Length of a Lens (another Method, Sherman's).



Let the line AB represent the length of a given object; AC the length of its image on the ground glass, and CD the length of a smaller image; then AD will be the difference in length of the two images. Let the line AE represent the distance between the two positions of the ground glass when each image was in perfect focus on it. (AX is a line of indefinite length, making an acute angle with AB.) Draw the line DE, intersecting AB and AX; draw BF parallel to DE; AF will be the focal length.

125.—Labarraque's Solution.

Chloride of lime	2 ounces
Carbonate of sodium, cryst.	4 ounces
Water	40 ounces

Mix the chloride of lime with 30 ounces of the water; and dissolve the carbonate of soda in the remainder. Mix, boil and filter.

126.—Eau de Javelle.

Dry chloride of lime	2 ounces
Carbonate of potash	4 ounces
Water	40 ounces

Mix the chloride of lime with half of the water ; dissolve the carbonate of potash in the remainder. Mix, boil and filter.

127.—A Few Remedies Against Blistering of Albumen Paper.

Do not dry the paper by excessive heat.
Avoid acidity in solutions.
Moisten the print before washing with a sponge saturated in alcohol.
Immerse the print before fixing in a weak alum.
Add a trace of aqua ammonia to the fixing bath.
Add one-tenth part of alcohol to the ordinary toning bath.

128.—Mat Black Varnish.

A tolerably strong solution of sandarac in alcohol, mixed with fine lampblack, dries without gloss, becomes hard without being brittle, and may be applied with a fine brush upon almost any substance.

129.—Invisible Ink.

Chloride of cobalt	50 gr.
Distilled water	1 fluid ounce
Glycerine	10 minims

Dissolve the chloride of cobalt in the distilled water, and add the glycerine.
Writing executed with this ink is invisible on paper, but on warming the writing turns blue. On exposure to damp air it becomes invisible again.

130.—Solution for Making Paper Adhere to Metal.

Tragacanth	30 Gm.
Gum arabic	120 Gm.
Water	500 C.c.

131.—To Precipitate Gold from Spent Sulphocyanate Toning Baths.

Add sulphuric acid and heat, when the gold will separate.

132.—To Keep Unmounted Albumen Prints Flat.

Soak them in equal parts of alcohol, glycerine and water ; dry between blotting paper under slight pressure.

133.—Magic Photographs.

Fix an albumen print in perfectly fresh hypo solution and wash well, and soak it in a solution of 1 part bichloride of mercury, $\frac{1}{4}$ of a part of chloride of ammonium in 60 parts of water, till the photograph is bleached out.
The picture will appear again when brought into contact with hypo solution, or moistened blotting paper previously prepared with the fixing soda.

134.—Solution for Mounting Prints Without Their Cockling.

Nelson's No. 1 photographic gelatine	4 ounces
Water	16 ounces
Glycerine	1 ounce
Alcohol	5 ounces

Dissolve the gelatine in the water, then add the glycerine, and lastly the alcohol.

135.—Permanent Paste.

Arrowroot	10 Gm.
Water	100 Gm.

in which 1 gramme of gelatine has been soaked, and boil. After cooling add 10 grammes of alcohol and a few drops of carbolic acid.

136.—Leather Collodion.

2 p. c. collodion	100 parts
Castor oil	4 parts

137.—Lubricator for Hot Burnishing.

Spermaceti	10 Gm.
Castile soap	10 Gm.
Alcohol	1 liter

138.—To Remove Silver Stains from the Hands.

Sulphate of sodium (Glauber's salt)	½ ounce
Chloride of lime	¼ ounce
Water	1 ounce

Mix thoroughly, and apply with an old toothbrush.

139.—To Frost a Skylight.

Very thin starch paste, to which unboiled starch has been added. Must be free from lumps, and be daubed on with a large bristle brush.

140.—To Remove Nitric Acid Stains from Hands or Garments.

Touch the stains with solution of permanganate of potassium; wash, rinse in dilute hydrochloric acid, and wash again.

141.—To Remove Yellow Stains from Bromide Prints.

Soak for one or two hours in

Acetic acid	2 ounces
Saturated oxalate of potassium solution	4 ounces

142.—To Remove Pyro Stains from Fingers.

Wash with a 10 per cent. solution of oxalic acid, or sulphuric acid, diluted with water, 1:20.

143.—To Remove Yellow Stains from Pyro Developed Negatives.

Bathe them in sulphorous acid water or in a 10 per cent. solution of sulphite of soda, to which a few drops of sulphuric acid has been added.

144.—To Remove the Odor of Hydrosulphate of Ammonium from the Dark-Room.

Sprinkle the floor with a solution of nitrate of lead.

145.—To Avoid Halation.

A quick drying coating, which is applied to the back of the plate, consists of collodion, with which any dark red or brown pigment is mixed. Spanish brown or rouge answers well.

146.—To Recover Silver Bromide from Waste Emulsion.

Let the emulsion be melted, and then add a small quantity of hydrochloric acid, following by boiling for two or three minutes. The silver bromide precipitates, and the destroyed gelatine is then poured off. The bromide is then placed among the other residues for reduction.

147.—Toning Bath for Gelatine Lantern Slides.

Chloride of platinum	1 gr.
Hydrochloric acid	1 minim
Water	32 ounces

148.—Compound for Blocking Out Large Portions of a Negative.

Mix asphaltum varnish with fine lamp-black, and apply with a camel's-hair brush.

Should be kept in well-stoppered bottles.

149.—Flash-Light Powder for Orthochromatic Plates.

Pure metallic magnesium powder	10 gr.
Nitrate of sodium (finely powdered)	from 50 to 70 gr.

Powder separately and mix on paper without rubbing.

150.—Largest and Smallest Quantities of Chemicals Admitted to the Pyro Developer.

	Largest.	Smallest.
Pyro, per ounce	10 gr.	1¼ gr.
Sulphite of sodium	80 gr.	5 gr.
Carb. of sodium	40 gr.	1 1-5 gr.
Carb. of potassium	21 2-10 gr.	5 gr.

151.—Consumption of Chemicals in Silver Printing on Albumenized Paper.

Of 100 parts of silver used in the albumen printing process will be found

In the finished print	3 per cent
In filters, blottings and cuttings	7 per cent
In the wash water before toning	50 to 55 per cent
In the fixing bath	30 to 35 per cent
In the wash water after fixing	5 per cent

90 per cent. of the silver used may be recovered.

One sheet of paper, 18 x 22, will take from the silver bath from 30 to 45 grains of nitrate of silver.

One sheet of paper, 18 x 22, requires to tone 1½ grains of gold (1 decigram).

About 80 to 90 grains of hyposulphite of sodium are necessary to fix one sheet of paper, 18 x 22.

152.—To Recover Fogged Plates.

Make a solution as follows:

Chromic acid	30 grains
Bromide of potassium	60 grains
Water	10 ounces

and immerse the plates for five minutes. Afterwards wash very thoroughly and rear up to dry.

Or, instead of the above, make the following:

Bichromate of potash	1 ounce
Hydrobromic acid	2 drachms
Water	10 ounces

If hydrobromic acid cannot be obtained, use hydrochloric acid or a soluble bromide; in the last case a few drops of sulphuric acid being added to the solution. Use as before.

TABLE SHOWING COMPARATIVE VALUE OF ALKALINE CARBONATES IN DEVELOPERS. By O. G. Mason.

Commercial Name.	Chemical Symbol.	Molecular Weight.	The Commercial Salt contains of the pure Salt about	100 parts of 36 per cent Acetic Acid Require for Saturation.	Solubility in Water (approximate).
Soda, Caustic..........................	NaHO	40	80 to 92%	26.66 p'rts of 90% Soda	1 part in 2
Sodium Carbonate, Carbonate of Soda, Sal Soda, Crystals, ...	$Na_2CO_3.10H_2O$	286	96 to 98%	89.38 " 96% "	1 " 2
The same, anhydrous or in dry powder...	Na_2CO_3	106	About 98 to 99%	89.38 of 98 to 99% dry Sal Soda.	1 " 6
Sodium Bicarbonate, Bicarbonate of Soda, "Sesqui-carbonate of Soda,"	$NaHCO_3$	84	98 to 100%	50.91 of 99% Bicarb. Soda.	1 " 12

Equal work is done by 80 parts of Caustic Soda, 286 parts of Sal Soda (crystals), 106 parts of Sal Soda (dry), 168 parts of Bicarbonate of Soda. These quantities must be increased to make up for any impurity contained in the sample being used; for this purpose the usual percentage of impurity given in the above table may be assumed for all ordinary photographical uses.

Commercial Name.	Chemical Symbol.	Molecular Weight.	The Commercial Salt contains of the pure Salt about	100 parts of 36 per cent Acetic Acid Require for Saturation.	Solubility in Water (approximate).
Potassa (Caustic Potash)..................	KHO	56	80 to 95%	37.33 parts of 90% Potassa.	1 part in 1
Potassium Carbonate, Carbonate of Potassa, Sal Tartar, Saleratus, ...	$K_2CO_3.1\frac{1}{2}H_2O$	165	76 to 96% Usually about 81%	51.11 parts of 81% Carb. Potassa.	1 " 1
Potassium, Carbonate, dry..............	K_2CO_3	140	About 95%	122.74 parts of 95% Carb. Potassa.	1 " 1
Potassium Bicarbonate, Bicarbonate of Potassa, ...	$KHCO_3$	100	100%	60 parts of 100% Bicarb. Potassa.	1 " 4

Equal work is done by 112 parts Caustic Potassa, 165 parts (about) ordinary Carbonate Potassa, 200 parts of Bicarbonate Potassa. These quantities must be increased in proportion to impurities, as noted in case of Soda These two alkalies are interchangeable for doing the same amount of work when *pure*, and when the one named in a given formula can not be obtained the table may assist in choosing a substitute of proper strength and solubility.

Dry or anhydrous Carbonate of Potassium is not usually found in the market.

By CHAS. JOB.

LOW WATER–BOSHAM, SUSSEX.

TABLE OF STRENGTHS OF ALCOHOL.

Specific Gravities of Mixtures of Different Proportions of Alcohol (s. g. .7932) and Water, by Weight and by Volume, at 14° R. (63.5° F.) Meisner.

Parts of		Specific Gravity of Mixture by Weight.	Specific Gravity of Mixture by Volume.	Parts of		Specific Gravity of Mixture by Weight.	Specific Gravity of Mixture by Volume.
Alcohol.	Water.			Alcohol.	Water.		
100	0	0.7932	0.7932	49	51	0.9196	0.9324
99	1	0.796	0.7969	48	52	0.9219	0.9344
98	2	0.7988	0.8006	47	53	0.9242	0.9364
97	3	0.8016	0.8042	46	54	0.9264	0.9384
96	4	0.8045	0.8078	45	55	0.928	0.9404
95	5	0.8074	0.8114	44	56	0.9308	0.9424
94	6	0.8104	0.815	43	57	0.9329	0.9443
93	7	0.8135	0.8185	42	58	0.9350	0.9461
92	8	0.8166	0.8219	41	59	0.9371	0.9478
91	9	0.8196	0.8253	40	60	0.9391	0.9495
90	10	0.8225	0 8286	39	61	0.9410	0.9512
89	11	0.8252	0.8317	38	62	0.9429	0.9529
88	12	0.8279	0.8346	37	63	0.9448	0.9547
87	13	0.8304	0.8373	36	64	0.9467	0.9564
86	14	0.8329	0.840	35	65	0.9486	0.958
85	15	0.8353	0.8427	34	66	0.9505	0.9695
84	16	0.8376	0.8454	33	67	0.9524	0.9609
83	17	0.8399	0.8581	32	68	0.9543	0.9621
82	18	0.8422	0.8508	31	69	0.9561	0.9632
81	19	0.8446	0.8534	30	70	0.9578	0.9643
80	20	0.847	0.8561	29	71	0.9594	0.9654
79	21	0.8494	0.8596	28	72	0.9608	0.9665
78	22	0.8519	0.8616	27	73	0.9621	0.9676
77	23	0.8543	0.8642	26	74	0.9634	0.9688
76	24	0.8567	0.8668	25	75	0.9647	0.970
75	25	0.859	0.8695	24	76	0.966	0.9712
74	26	0.8613	0.8723	23	77	0.9673	0.9723
73	27	0.8635	0.8751	22	78	0.9686	0.9734
72	28	0.8657	0.8779	21	79	0.9699	0.9745
71	29	0.868	0.8806	20	80	0.9712	0.9756
70	30	0.8704	0.8833	19	81	0.9725	0.9766
69	31	0.8729	0.886	18	82	0.9738	0.9775
68	32	0.8755	0.8885	17	83	0.9751	0.9784
67	33	0.8781	0.891	16	84	0.9763	0.9793
66	34	0.8806	0.8934	15	85	0.9795	0.9803
65	35	0.8831	0.8958	14	86	0.9786	0.9813
64	36	0.8855	0.8982	13	87	0.9796	0.9823
63	37	0.8879	0.9096	12	88	0.9806	0.9834
62	38	0.8902	0.9029	11	89	0.9817	0.9846
61	39	0.8925	0.9052	10	90	0.9830	0.9849
60	40	0.8948	0.9075	9	91	0.9844	0.9873
59	41	0.8971	0.9098	8	92	0.9860	0.9888
58	42	0.8994	0.9121	7	93	0.9878	0.9901
57	43	0.9016	0.9145	6	94	0.9897	0.9915
56	44	0.9038	0.9168	5	95	0.9914	0.9929
55	45	0.9060	0.9191	4	96	0.9931	0.9943
54	46	0.9082	0.9214	3	97	0.9948	0.9957
53	47	0.9104	0.9237	2	98	0.9965	0.9971
52	48	0.9127	0.9259	1	99	0.9982	0.9985
51	49	0.915	0.9281	0	100	1.0000	1.0000
50	50	0.9173	0.9303	..	..	......	......

TABLE OF THE SYMBOLS, ATOMICITY, ATOMIC AND EQUIVALENT WEIGHTS OF THE ELEMENTS.

Name.	Symbol.	Atomicity.	Atomic Weight.	Equivalent Weight.
Aluminum	Al	iii (iv)	27.5	13.7
Antimony (Stibium)	Sb	iii (v)	122.0	122.0
Arsen	As	iii (v)	75.0	75.0
Barium	Ba	ii	137.0	68.5
Beryllium (Glucinum)	Be	ii or iii	9.4	4.7
Bismuth	Bi	iii (v)	208.0	208 0
Boron	Bo	iii (v)	11.0	11.0
Bromine	Br	i (iii, v, vii)	80.0	80.0
Carbon	C	iv	12.0	6.0
Cadmium	Cd	ii	112.0	56.0
Caesium	Cs	i	133.0	133.0
Calcium	Ca	ii	40.0	20.0
Cerium	Ce	iii (iv)	138.0	46.0
Chlorine	Cl	i (iii, v, vii)	35.5	35.5
Chromium	Cr	iv (vi)	52.2	26.1
Cobalt	Co	ii (iv)	58.8	29.4
Copper	Cu	ii	63.4	31.7
Didymium	Di	iii	145.0	
Erbium	E	iii	169.0	
Fluorine	F	i	19.0	19.0
Gallium	Ga	iv	68.0	
Germanium	Ge	iv	72.2	
Glucinum	G	ii	9.4	4.7
Gold	Au	i (iii)	196.0	196.0
Hydrogen	H	i	1.0	1.0
Indium	In	iii (iv?)	113.4	37.8
Iodine	I	i, iii, v, vii	127.0	127.0
Iridium	Ir	ii (iv, vi)	198.0	99.0
Iron	Fe	ii (iv, vi)	56.0	28.0
Lanthanium	La	iii	139.0	46.3
Lead (Plumbum)	Pb	ii (iv)	207.0	103.5
Lithium	Li	i	7.0	7.0
Magnesium	Mg	ii	24.0	12.0
Manganese	Mn	ii (iv, vi, vii)	55.0	27.5
Mercury	Hg	ii	200.0	100.0
Molybdenum	Mo	vi	96.0	46.0

TABLE OF THE SYMBOLS, ETC.—(*Continued.*)

Name.	Symbol.	Atomicity.	Atomic Weight.	Equivalent Weight.
Niobium (Columbium)	Nb	v	94.0	18.8
Nickel	Ni	ii (iv)	58.8	29.4
Nitrogen	N	iii (v)	14.0	14.0
Osmium	Os	ii (iv, vi, viii)	199.0	99.5
Oxygen	O	ii (iv?)	16.0	8.0
Palladium	Pd	(ii, iv, vi)	106.6	53.25
Phosphorus	P	iii (v)	31.0	31.0
Platinum	Pt	ii (iv, vi)	197.4	98.7
Potassium (Kalium)	K	i	39.0	39.0
Rhodium	Rh	ii (vi)	104.4	52.2
Rubidium	Rb	i (v)	85.4	85.4
Ruthenium	Ru	ii (iv, vi, viii)	104.4	52.2
Scandium	Sc	ii (iv, vi, viii)	43.9	52.2
Selenium	Se	ii (iv, vi)	79.4	39.7
Silicon (Silicium)	Si	iv	28.0	14.0
Silver (Argentum)	Ag	i	108.0	108.0
Sodium (Natrium)	Na	i	23.0	23.0
Strontium	Sr	ii	87.5	43.7
Sulphur	S	ii (iv, vi)	32.0	16.0
Tantalum	Ta	v	182.0	36.4
Tellurium	Te	ii (iv, vi)	127.0	64.0
Thallium	Tl	i (iii)	204.0	204.0
Thorium	Th	iv	231.5	57.87
Tin (Stannum)	Sn	ii, iv	118.0	59.0
Tungsten (Wolfram)	W	iv, vi	184.0	92.0
Uranium	U	vi (iv)	240.0	60.0
Vanadium	V	iii (v)	51.2	51.2
Ytterbium	Yt	iv	172.6	17.1
Yttrium	Y	ii	61.7	30.85
Zinc	Zn	ii	65.0	32.5
Zirconium	Zr	iv	90.0	44.8

TABLE OF SYMBOLS, ATOMIC WEIGHT AND SOLUBILITIES OF THE PRINCIPAL CHEMICALS USED IN PHOTOGRAPHY.

Abbreviations.—s., soluble; v. s., very soluble; sp. s., sparingly soluble; n. s., not soluble; dec., decomposed; del., deliquescent.

Name.	Symbol.	Molecular Weight.	One Part is Soluble in Cold Water.	One Part is Soluble in Hot Water.	Alcohol.
Acid, Acetic	$C_2H_4O_2$	60	in	any pro	portion.
" Boric or Boracic	H_3BO_3	62	25	3	6
" Carbolic (see Phenol)	C_6H_6O	94	16.6	3	6
" Citric	$C_6H_8O_7+H_2O$	210	0.75	0.5	s.
" Digallic (see Tannin)	$C_{27}H_{22}O_{17}$	618	0.8	0.5	0.8
" Gallic	$C_7H_6O_5+H_2O$	188	100	3	8
" Hydrobromic	HBr	81	s.	s.	s.
" Hydroiodic	HI	128	s.	s.	s.
" Hydrochloric	$HCl+7H_2O$	36.5	s.	s.	s.
" Hydrofluoric	$HFl+3H_2O$	74	s.	s.	s.
" Hydrocyanic	HCy	27	s.	s.	s.
" Hydrosulphuric	H_2S	34	s.	s.	s.
" Muriatic (see Hydrochloric)					
" Nitric	HNO_3	63	in	all propor	tions.
" Nitrous	HNO_2	47	ab	sorbed.	
" Oxalic	$C_2H_2O_4+2H_2O$	126	8	0.2	s. also in ether
" Pyrogallic (see Pyrogallol)	$C_6H_6O_3$	126	2	v. s.	also v. s. in ether.
" Salicylic	$C_7H_6O_3$	138	7.6	9	also v. s. in ether.
" Sulphuric	H_2SO_4	98	in	all propor	tions.
" Sulphurous	H_2SO_3	82	ab	sorbed.	
" Tannic (see Digallic)					
" Tartaric	$C_4H_6O_4$	150	0.8	0.5	5
Alcohol, Ethyl	C_2H_6O	46	in	all propor	tions.

Alcohol, Methyl (see Wood Alcohol)	CH_4O	32	in	all propor	tions.
Alum (see Potassium Aluminium Sulphate)	$Al_2(SO_4)_3K_2SO_424H_2O$	948	10	8	n. s.
Alum Chrome (see Potassium Chromic Sulph.)	$Cr_2(SO_4)_3K_2SO_424H_2O$	999	10	dec.	n. s.
Amidol (Diamido Phenol)	$C_6H_8N_2O$	124	very	soluble.	....
Ammonia, Gaseous	NH_3	17	very	soluble.	....
Ammonium Bichromate	$(NH_4)_2Cr_2O_7$	252	v. s.	v. s.	....
" Bromide	$NH_4Br.$	98	1.29	0.7	31.5
" Cadmium Bromide	$2NH_4Br2CdBr_2+H_2O$	584	0.73	....	5.3
" " Iodide	$2NH_4ICdI_2+2H_2O$	692	0.58	....	0.70
" Chloride	NH_4Cl	53.5	3	1	sp. s.
" Ferric Oxalate	$Fe_2(C_2O_4)_6(NH_4)_6+8H_2O$	892	2.10	0.29	sp. s.
" Fluoride	NH_4Fl	37	v. s.	v. s.	sp. s.
" Iodide	NH_4I	145	1	0.5	s.
" Nitrate	NH_4NO_3	80	2	1	s.
" Oxalate	$(NH_4)_2C_2O_4$	124	4	2	s.
" Sulphide	$NH_4HS.$	51	v. s.	v. s.	o. s.
" Sulpho-Cyanate	NH_4CNS	76	s.	s.	s.
Aurantia (Hexanitro-diphenylamin Ammonia)	$C_{12}H_4(NO_2)_6N,NH_4$	456	....	....	....
Aurin (Trioxy-triphenyl-Carbinol)	$C_{19}H_{14}O_3$	290	....	....	....
Barium Chloride	$BaCl_2+2H_2O$	345	2.18	1.5	sp. s.
" Nitrate	$Ba(NO_3)$	261	12.2	2.84	n. s.
" Per-oxide	BaO_2	169	v. s.	n. s.	n. s.
Benzole or Benzine (Trioxy-triphenyl-Carbinol)	C_6H_6	78	n. s.	n. s.	s.
Borax (see Sodium Biborate)	....	....	....	....	....
Cadmium Bromide	$CdBr_2+4H_2O$	344	1.5	1	sp. s.
" Iodide	CdI_2	366	1 5	1	s.
Calcium Bromide	$CaBr_2+4H_2O$	272	1	.75	s.
" Carbonate (see Chalk)	$CaCO_3$	100	n. s.	n. s.	n. s.
" Chloride	$CaCl_2$	111	.75	.5	10.
" Hypochlorite (see Chloride of Lime)	$CaCl_2O_2CaCl_2$(?)	254	sp. s.	sp. s.	dec.
Calomel (see Mercurous Chloride)	....	....	....	....	....
Camphor	$C_{10}H_{16}O$	152	1000	....	v. s.
Caustic Potash (see Potassium Hydrate)	....	....	....	....	....
" Soda (see Sodium Hydrate)	....	....	....	....	....
Chalk (see Calcium Carbonate)	....	....	....	....	....

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Abbreviations.—s., soluble; v. s., very soluble; sp. s., sparingly soluble; n. s., not soluble; dec., decomposed; del., deliquescent.

Name.	Symbol.	Molecular Weight.	One Part is Soluble in Cold Water.	One Part is Soluble in Hot Water.	Alcohol.
Chinoline Blue or Cyanine	$C_{29}H_{35}NaI$	538	sp. s.	sp. s.	s.
" Red	$C_{26}H_{19}NaCl$	394.5	....	....	....
Chloride of Lime (see Calcium Hypochlorite)	....	....	....	....	....
Chlorine	Cl	35 5	absorbed by 1 to 2.5 vols.	....	....
Chloroform	$CHCl_2$	119.5	sp. s.	sp. s.	v. s.
Chrome Alum (see Alum Chrome)	....	....	....	....	....
Copper Acetate (see Verdigris)	$Cu(C_3H_3O_2)_2,H_2O$	199	14	5	1 in 14
" Bromide	$CuBr_2$	223.4	1	.75	s.
" Chloride	$CuCl_2,H_2O$	170.5	1	.75	v. s.
" Sulphate (see Blue Vitriol)	$CuSO_4,5H_2O$	249.2	3	1	n. s.
" " and Ammonia	$CuSO_4,4NH_3+H_2O$	245.5	s.	v. s.	n. s.
Corrosive Sublimate (see Mercuric Chloride)	....	....	....	....	....
Dextrine	$C_6H_{10}O_5$	162	easily s.		n. s.
Eikonogen (Amido-β-Naphthol-β-Monosulphonate of Sodium)	$C_{10}H_3SO_2NaN$	261	40	e. s.	s.
Eosine, Yellow Shade (Tetra Bromo-fluoresceine Potassium)	$C_{20}H_6Br_4O_5K_2$	724	s.	s.	s.
Eosine, Red Shade (Tetra Brom.-fluores. Sod)	$C_{20}H_6Br_4O_5Na_2$	692	s.	s.	s.
Epsom Salt (see Magnesium Sulphate)	....	....	....	....	....
Erythrosine M. (Tetra Iodo-fluoresceine Potassium or Sodium)	$C_{20}H_6I_4O_5K_2$ or Na_2	912 or 880	s.	s.	s.
Erythrosine G. (Di-iodo-fluoresceine Potassium or Sodium)	$C_{20}H_6I_2O_5K_2$ or Na_2	660 or 628	s.	s.	s.

Gelatine, Glutine	49,3C,6,6H18,3N25,8O	1267.2	sp. s.	e. s.	n. s.
Glycerine	$C_3H_8O_3$	92	in	all propor	tions.
Glycine (Oxy-phenylglycine)	$C_8H_9O_3N$	167	....	....	....
Gold, Neutral Chloride	$AuCl_3$	303.5	1	5	also in ether.
" and Cadmium Chloride	$CaAuCl_5$	414.5	s.	s.	s.
" and Potassium Chloride	$KAuCl_4+5H_2O$	468	s.	s.	s.
" and Sodium Chloride	$NaAuCl_4+8NaCl+2H_2O$	892	s.	s.	s.
" Sodium Hyposulphite	$AuNa_3S_4+2H_2O$	525	s.	s.	s.
Gun Cotton (Tetra-nitrate Cellulose)	$C_{12}H_{16}O_6(NO_3)_4$	564	n. s.	n. s.	in ether
" " (Tri-nitrate Cellulose)	$C_{10}H_{17}O_7(NO_6)_3$	459	n. s.	n. s.	alcohol
Hydrochinone	$C_6H_6O_2$	110	s.	s.	also in ether.
Hydroxylamine Hydrochlorate	NH_3OHCl	69.5	0.6	e. s.	4
Iodine	I	127	sp. s.	sp. s.	e. s.
Iridium Tetra-chloride	$IrCl_4$	335	....	....	....
Iron, Ammonium Sulphate	$FeSO_4(NH_4)_2SO_4+6H_2O$	392	v. s.	dec.	n. s.
" Chloride (Ferric)	Fe_2Cl_6	325	.75	.5	1 in 1
" Chloride (Ferrous)	$FeCl_2$	127	2	1	1 in 1
" Citrate	$Fe_2(C_6H_5O_7)_2$	598	s.	s.	n. s.
" Citrate and Ammonia	$(C_6H_5O_7)_2Fe_2(NH_4)_3$	355	s.	s.	sp. s.
" Iodide	FeI_2	310	v. s.	v. s.	v. s.
" Nitrate	$Fe(NO_3)_2,6H_2O$	288	v. s.	dec.	dec.
" Oxalate (Ferric)	$Fe_2(C_2O_4)_3$	376	s.	s.	n. s.
" " (Ferrous)	FeC_2O_4	144	in potas	sium oxal.	n. s.
" Sulphate (Ferric)	$Fe_2(SO_4)_3$	400	s.	dec.	s.
" " (Ferrous)	$FeSO_4,7H_2O$	278	1.5	1	n. s.
Kaoline	$H_2Al_2Si_2O_8+H_2O$	258.8	not	soluble.	....
Lead, Acetate (see Sugar of Lead)	$Pb(C_2H_3O_2)_2,3H_2O$	378	2.5	2	1 in 12.5
" Carbonate	$PbCO_4$	366	n. s.	sp. s.	n. s.
" Iodide	PbI_2	460	s.	s.	n. s.
" Nitrate	$Pb(NO_3)_2$	330	7.7	7	s.
" Oxide	PbO	222.4	n. s.	n. s.	Alkalis.
Lithium, Bromide	LiBr	87	.66	.5	v. s.
" Chloride	$LiCl+H_2O$	60.5	1.3	1	s.
" Iodide	LiI	134	.61	.5	s.
Magnesium, Bromide	$MgBr_2$	184	1	.75	s.

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Abbreviations.—s., soluble; v. s., very soluble: sp. s., sparingly soluble; n. s., not soluble; dec., decomposed; del., deliquescent.

Name.	Symbol.	Molecular Weight.	One Part is Soluble in Cold Water.	One Part is Soluble in Hot Water.	Alcohol.
Magnesuim, Chloride	$MgCl_2$	95	2	1.5	s.
" Iodide	MgI_2	246.3	1	.75	v. s.
" Sulphate (see Epsom Salt)	$MgSO_4,7H_2O$	246	1.3	1	sp. s.
Manganous Chloride	$MnCl_2+4H_2O$	198	s.	s.	n. s.
Mercury, Chloride (Mercuric) (see Corros. Subl.)	$HgCl_2$	271	19	3	5
" " (Mercurous) (see Calomel)	Hg_2Cl	235.5	n. s.	n. s.	n. s.
" Cyanide	$HgCy_2$	252	8	2	1 in 20
" Iodide (Mercuric)	HgI_2	454	sp. s.	sp. s.	sp. s.
" " (Mercurous)	Hg_2I	654	n. s.	n. s.	n. s.
Metol (Mono-methyl Para-amidometakresol)	$C_8H_{11}NO$	137	s.	s.	s.
Para-amidophenol	C_6H_7NO	109	sp. s.	s.	....
Para-amidophenol Sodium	C_6H_6NaNO	131	easily	soluble.	....
Para-amidophenol Hydrochlorate	C_6H_7NOHCl	145.5	s.	s.	s.
Para-rosaniline (Triamido-phenyl-Carbinol)	$C_{19}H_{19}N_3O$	305	....	....	....
Phenol (see Carbolic Acid)	....	....	....	....	....
Platino-potassium Chloride or Chloro-platinite of Potassium	K_2PtCl_4	417.4	6.	....	s.
Platino-sodium Chloride or Chloro-platinite of Sodium	Na_2PtCl_4	385.4	solu	ble.	....
Platinum Chloride.	$PtCl_4+5H_2O$	429.4	....	*	....
Potassa (see Potassium Hydrate).	....	....	....	....	....

* Real platinum-chloride is but little soluble in water; the article of commerce of that name answers to the formula $PtCl_4 2HCl+6H_2O$, and is of the atomic weight 520.4 (K. Schwier). It is easily soluble in water, probably in the proportion of 1:6.

Potassium, Aluminium Sulphate (see Alum).	$Al_2(SO_4)_3,K_2SO_4,24H_2O$	948	10	8	n. s.
" Bicarbonate	$KHCO_3$	100	3	2	n. s.
" Bichromate	$K_2Cr_2O_7$	295	10	7	n. s.
" Bromide	KBr	119	2	1	1 in 90
" Carbonate	$KO_2C_3+2H_2O$	174	.75	.5	n. s.
" Chlorate	$KClO_3$	122.5	16	2	n. s.
" Chloride	KCl	74.5	3	2	sp. s.
" Chromic Sulph. (see Chrome Alum)	$Cr_2(SO_4)_3,K_2SO_4,24H_2O$	999	10	dec.	n. s.
" Citrate	$K_3C_6H_5O_7H_2O$	324.3	6.6	.3	n. s.
" Cyanide	KCy	65.1	1	.5	sp. s.
" Ferric Sulphate	$K_2SO_4,Fe_2(SO_4)_3,24H_2O$	100.6	s.	s.	n. s.
" Ferri-cyanide (see Red Prussiate)	$K_6Fe_2Cy_{12}$	658.6	2.5	1.2	n. s.
" Ferro-cyanide (see Yellow Pruss.)	K_4FeCy_6	368.4	3	1	n. s.
" Fluoride	$KFl+2H_2O$	94	v. s.	v. s.	v. s.
" Hydrate	KOH	56	.5	.25	sp. s.
" Iodide	KI	166	.75	.5	1 in 16
" Nitrate (see Saltpetre)	KNO_3	101	4	1	n. s.
" Oxalate	$KC_2O_4H_2O$	235	3	2	sp. s.
" Permanganate	$KMnO_4$	158	16	10	n. s.
" Sulpho-cyanate	$KCyS$	97	2	1	sp. s.
Pyrogallo. (see Pyrogallic Acid)	....	....	....	....	....
Rhodan (German appellation for Cyanates)	....	....	....	....	....
Rodinal (ready-prepared Para-amido Developer)	....	....	....	....	....
Silver, Acetate	$AgC_2H_3O^2$	167	sp. s.	sp. s.	n. s.
" Bromide	$AgBr$	188	n. s.	n. s.	in HCl and HBr.
" Carbonate	Ag_2CO_3	276	n. s.	n. s.	n. s.
" Chloride	$AgCl$	143.5	n. s.	n. s.	Ammonia, cyan. potass. hyposulphite of soda.
" Citrate	$Ag_3C_6H_5O_7$	513	sp. s.	sp. s.	....
" Fluoride	$AgFl$	127	v. s.	v. s.	v. s.
" Iodide	AgI	235	n. s.	n. s.	same as Chloride.
" Nitrate	$AgNO_3$	170	1	.5	sp. s.

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Name.	Symbol.	Molecular Weight.	One Part is Soluble in Cold Water.	One Part is Soluble in Hot Water.	Alcohol.
Silver, Nitrite	$AgNO_2$	154	300	dec.	n. s.
" Oxalate	$Ag_2C_2O_4$	304	sp. s.	s.	n. s.
" Oxide	Ag_2O	232	n. s.	n. s.	n. s.
" Sulphide	Ag_2S	248	n. s.	n. s.	n. s.
Soda, Caustic (see Sodium Hydrate)					
Sodium Acetate	$NaC_2H_3O_2,6H_2O$	190	3	.66	n. s.
" Biborate (Borax)	$Na_2B_4O_7,10H_2O$	382	12.5	2	n. s.
" Bromide	$NaBr$	103	1.25	1	1:16
" Bicarbonate	$NaHCO_3$	84	12	dec.	n. s.
" Carbonate	$Na_2CO_3,10H_2O$	286	2	1	n. s.
" Chloride	$NaCl$	58.5	2.75	2.75	n. s.
" Citrate	$Na_3C_6H_5O_7$	258	1	.5	sp. s.
" Hydrate	$NaHO$	40	1.5	·5	sp. s.
" Hypo-sulphite	$Na_2S_2O_35H_2O$	248	1.5	1	sp. s.
" Iodide	NaI	150	5	.3	sp. s.
" Nitrate	$NaNO_3$	85	1.36	1	1 in 37
" Sulph-antimoniate or Schlippe's Salt	$NaSbS_3$	241	s.	s.	n. s.
" Sulphate	$Na_2SO_4,10H_2O$	322	2	4	s.
" Sulphide	$Na_2S,9H_2O$	240	s.	s.	sp. s.
" Sulphite	$Na_2SO_3,7H_2O$	252	4	2	sp. s.
" Tungstate	$Na_2WO_4+2H_2O$	326	s.	s.	n. s.
" Thio-sulphate (see Hypo-sulphite)					
Strontium, Bromide	$SrBr_2,6H_2O$	355.5	1	.75	sp. s.
" Chloride	$SrCl_2,6H_2O$	266.5	1.8	1	sp. s.

Strontium, Nitrate	$Sr(NO_3)_2$	211.5	5	2	sp. s.
Sugar of Lead (see Lead Acetate)	....	....	....	....	....
Tannin (see Digallic Acid)	....	....	....	....	....
Thymol	$C_6H_3(CH_3(C_3H_7)COO$	177	sp.	....	and in ether.
Tin, Chloride (Stannic)	$SnCl_4$	260	dec.	in much	water.
" Chloride (Stannous)	$SnCl_2,2H_2O$	225	135:100	655:100	v. s.
Uranium, Bromide	$UBr_2,4H_2O$	352	1	.5	sp. s.
" Nitrate	$UO_2(NO_3)_2,6H_2O$	384	.5	.25	v. s.
" Sulphate	$UO_2(SO_4),3H_2O$	302	.5	.25	v. s.
Verdigris (see Copper Acetate)	....	....	....	....	....
Vitriol, Blue (see Copper Sulphate)	....	....	....	....	....
" Green (see Iron Sulphate)	....	....	....	....	....
" White (see Zinc Sulphate)	....	....	....	....	....
Water	H_2O	18	....	....	....
Washing Soda (see Sodium Carbonate)	....	....	....	....	....
Wood Alcohol (see Alcohol Methyl)	....	....	....	....	....
Zinc, Bromide	$ZnBr_2$	225	del.	and e. s.	s.
" Chloride	$ZnCl_2$	136	.33	....	s.
" Iodide	ZnI_2	319	.33	dec.	v. s.
" Nitrate	$Zn(NO_3)_2,6H_2O$	296	del.	del.	del.
" Sulphate (see White Vitriol)	$ZnSO_4,7H_2O$	287	2.	1.	n. s.
Zircon Earth	Z_1O_2	121.6	n. s.	n. s.	n. s.

IMPURITIES IN PHOTOGRAPHIC CHEMICALS AND TESTS FOR THEM.

Substance.	Impurities Possibly Present.	Tests.
Ammonia	Carbonic Acid.	Renders lime-water milky.
	Dissolved solid matter	Residue left on evaporation.
	Chlorides.	After acidulating with nitric acid, it gives a precipitate with silver nitrate, which, after washing, is readily soluble in ammonia, and re-precipitated by nitric acid.
	Sulphates.	After acidulating with nitric acid, it gives a precipitate with barium nitrate.
	Lime.	A white precipitate with oxalate of ammonium.
	Lead is often present, derived from the action upon flint glass bottles.	Black precipitate with sulphuretted hydrogen.
Nitric Acid	Traces of sulphuric acid.	After dilution it gives a precipitate with barium nitrate.
	Chlorides.	After dilution it gives a precipitate with silver nitrate.
	Peroxide of nitrogen.	The acid is yellow.
	Iodine may be present if the acid be prepared from sodium nitrate.	After dilution and cooling it gives a blue color with starch paste or mucilage.
Hydrochloric Acid	Free chlorine.	Liberates iodine from solution of potassium iodide. See also chlorides, nitric acid.
	Sulphuric acid.	As above for nitric acid.
	Perchloride of iron.	Yellow color. Brown precipitate with ammonia added till it smells slightly.
Hydrochloric Acid	Arsenic.	Marsh's test.
	Some yellow samples contain no iron, but an organic salt, and give an alkaline ash on ignition of the residue after evaporation.	Reinsh's test; a small piece of copper foil becomes coated on boiling in dilute acid.
Sulphuric Acid	Bisulphate of potassium.	Residue on evaporation.
	Sulphate of lead.	Milkiness on dilution. May be completely freed from lead by diluting with three or four times as much water, and allowing to settle.
	When sold as pure, it invariably contains a trace of iron. Common acid is also liable to contain arsenic, selenium, thallium, and many other substances.	No easy test can be given, as the substances are so numerous; some of them volatile, and most require separation from the acid before detection.
	Organic matter, as a piece of straw in a carboy of acid.	Gives a brown color to the acid.
Acetic Acid	Water.	Does not solidify when cooled to 17° C, (53° F.)
	Sulphurous and hydrochloric acids.	White precipitate with silver nitrate.
	Aldehyde, or volatile tarry matter.	Blackens in the light after adding silver nitrate.
	Organic sulphuric acid.	Smell of garlic.
Citric Acid	Tartaric acid.	Strong solution of potassium acetate added to a strong solution of the acid will deposit white crystalline bitartrate.
Pyrogallic Acid	Metagallic acid.	Black residue insoluble in water.
Silver Nitrate	Free nitric acid.	Reddens litmus paper (neutral silver nitrate does not affect litmus).
Potassium Carbonate	Chlorides and sulphates.	Same as for ammonia.
Potassium Iodide	Potassium carbonate.	A strong solution is alkaline to test paper.
	Sulphates and chlorides.	Same as for ammonia.
	Potassium iodate.	A pretty strong solution becomes yellow from liberation of iodine on addition of dilute sulphuric acid, or better, a strong solution of citric acid.

IMPURITIES IN PHOTOGRAPHIC CHEMICALS AND TESTS FOR THEM.—*Continued.*

SUBSTANCE.	IMPURITIES POSSIBLY PRESENT.	TEST.
Potassium Bromide	Similar to potassium iodide.	See potassium iodide.
Sodium Carbonate	Chlorides and sulphates.	Same as for ammonia.
Sodium Chloride	Chloride of calcium. Chloride of magnesium.	Oxalate of ammonium (after addition of a little acetic acid) gives a milkiness or precipitate, indicating calcium; filter this out, and add ammonia, chloride of ammonium, and phosphate of sodium (clear solutions). A precipitate indicates magnesium. Both the above cause dampness in wet weather.
	Sodium sulphate.	As for sulphates in ammonia.
Potassium Cyanide Potassium Hydrate	Potassium carbonate nearly always present.	Effervescence with dilute acids, giving off a gas carbonic anhydride, which renders lime water turbid.
Kaolin	Chalk.	Effervescence with dilute acids.
Water	Sulphates and chlorides.	Same as for ammonia.
	Calcium carbonate, temporary hardness.	Deposited by boiling.
	Ammonia, almost always present in distilled and rain water.	Test as for calcium chloride, see sodium chloride. Brown coloration, or precipitate with Nessler's re-agent.
Gelatine	Alum.	Ash, sometimes as much as 10 per cent.
	Fatty matter.	Separated by precipitation with alcohol. Dissolved out by ether or benzine, and left as a residue on evaporation of the solvent.
Ammonium Bromide	Potassium bromide, or other non-volatile bodies.	Leaves a residue when heated.
	Ammonium chloride.	Same as for chlorides in ammonia.
Pyrogallic Acid	Powdered glass.	Left behind on solution.
Potassium Iodide	Potassium bromide.	The crystals of bromide are usually more transparent than those of iodide, but no reliance can be placed on this.
Silver Nitrate	Potassium nitrate, sometimes present in the fused sticks, not in the crystals.	Will not yield the full quantity of chloride on precipitation with HCl. Gives a purple color to flame.
Calcium Chloride	Calcium hydrate.	The clear filtered solution made with distilled water is alkaline to test paper, and gives a precipitate on breathing into it through a tube.
Pure Chemicals generally.	Broken glass, bits of straw, wood, paper, &c.	These impurities either float or sink on the solution, and may easily be seen.

PERCENTAGE OF REAL AMMONIA IN SOLUTIONS OF DIFFERENT DENSITIES AT 14° CENTIGRAD.—CARIUS.

Specific Gravity.	Percent'ge Ammonia.	Specific Gravity.	Percent'ge Ammonia.	Specific Gravity,	Percent'ge Ammonia.	Specific Gravity.	Percent'ge Ammonia.
0.8844	36.0	0.9052	27.0	0.9314	18.0	0.9631	9.0
0.8864	35.0	0.9078	26.0	0.9347	17.0	0.9670	8.0
0.8885	34.0	0.9106	25.0	0.9380	16.0	0.9709	7.0
0.8907	33.0	0.9133	24.0	0.9414	15.0	0.9749	6.0
0.8929	32.0	0.9162	23.0	0.9449	14.0	0.9790	5.0
0.8953	31.0	0 9191	22.0	0.9484	13.0	0.9831	4.0
0.8976	30.0	0.9221	21.0	0.9520	12.0	0.9873	3.0
0.9001	29.0	0.9251	20.0	0.9556	11.0	0.9915	2.0
0.9026	28.0	0.9283	19.0	0.9593	10.0	0.9959	1.0

SOLUBILITY OF THE SILVER HALOIDS. By E. Valenta.

In the *Photographic Society's Journal* the following table, the result of a series of experiments, is given.

Solvent.	Concentration.	100 g. of solution can dissolve in grammes.			Remarks.
		Ag Cl.	Ag Br.	Ag I.	
Sodium hyposulphite	1 : 100	0.40	0.35	0.03	
" "	5 : 100	2.00	1.90	0.15	
" "	10 : 100	4.10	3.50	0.30	The estimations were made at 20° C.
" "	15 : 100	5.50	4.20	0.40	
" "	20 : 100	6.10	5.80	0.60	
Ammonium hyposulphite	1 : 100	0 57	....	....	For bromide and iodide of silver
" "	5 : 100	1.32	....	....	similar results were obtained as
" "	10 : 100	3.92	....	....	with sodium hyposulphite.
Sodium sulphite	10 : 100	0.44	0.04	0.01	
" "	20 : 100	0.95	0.08	0.02	
Ammonium sulphite	10 : 100		traces		
Ammonium carbonate	10 : 100	0.05	....	....	
Ammonia	3%	1.40	....	....	
"	15%	7.58	....	....	
Magnesium chloride	50 : 100	0.50	..	...	
Potassium cyanide	5 : 100	2.75	6.55	8.23	25° C.
Ammonium sulphocyanide	5 : 100	0.08	0.21	0.02	
" "	10 : 100	0.54	2.04	0.08	23° C.
" "	15 : 100	2.88	5.30	0.13	
Potassium sulphocyanide	10 : 100	0.11	0.73	....	25° C.
Calcium sulphocyanide	10 : 100	0.15	0.53	0.03	
Barium sulphocyanide	10 : 100	0.20	0.35	0.02	
Aluminium sulphocyanide	10 : 100	2.02	4.50	0.02	
Thiocarbamide	10 : 100	0.83	1.87	0.79	25° C.
Thiosinamin	1 : 100	0.40	0.08	0.008	
"	5 : 100	1.90	0.35	0.05	
"	10 : 100	3.90	0.72	0.09	

TABLE OF EQUIVALENT QUANTITIES OF SOME HALOIDS USED IN PHOTOGRAPHY.

Calculated for the Anhydrous and Dry Salts.

By A. B. Aubert, Professor of Chemistry, Maine State College, Orono, Me.

†Equivalent Quantities of Various Chlorides Used in Photography.

Sodium Chloride.	Potassium Chloride.	Ammonium Chloride.	Lithium Chloride.	Cadmium Chloride.
1	1.275	0.914	0.726	1.564
0.784	1	0.717	0.569	1 226
1.093	1.394	1	0.794	1.710
1.376	1.755	1.258	1	2.152
0.639	0 818	0.584	0.464	1

†Equivalent Quantities of Various Bromides Used in Photography.

Bromine.	Ammonium Bromide.	Potassium Bromide.	Sodium Bromide.	Cadmium Bromide + 4 Equi. Water.	Zinc Bromide.
1	1.225	1.488	1.287	2.150	1.406
0.816	1	1.214	1.055	1.754	1.147
0.672	0.823	1	0.865	1.445	0.945
0.777	0.952	1.156	1	1.671	1.092
0.465	0.570	0.692	0.599	1	0.654
0.711	0.871	1 058	0.915	1.529	1

†Equivalent Quantities of Various Iodides Used in Photography.

Iodine.	Ammonium Iodide.	Potassium Iodide.	Sodium Iodide.	Cadmium Iodide.	Zinc Iodide.
1	1.142	1.307	1.181	1.441	1.255
0.876	1	1.145	1.035	1.262	1.099
0.765	0.874	1	0.903	1.102	0.960
0.847	0.967	1.107	1	1.220	1.063
0.694	0.793	0.907	0.820	1	0.871
0.797	0.910	1.042	0.941	1.148	1

†Equivalent Quantities of Various Silver Salts Used in Photography.

Silver (Metallic).	Nitrate.	Chloride.	Bromide.	Iodide.
1	1.574	1.328	1.741	2.176
0.6353	1	0.844	1.106	1.382
0.7523	1.184	1	1.310	1.638
0.5744	0.904	0.763	1	1.250
0.4595	0.723	0.610	0.800	1

†Equivalent Quantites of Various Gold Salts Used in Photography.

Gold (Metallic).	Chloride.	Double Chloride of Gold and Potassium.	Double Chloride of Gold and Sodium.
1	1.542	2.1048	2.0229
0.6485	1	1.3645	1.3119
0.4751	0.7326	1	0.9611
0.4943	0.7623	1.0405	1

† Translated and partly recalculated from the "Agenda du Chimiste."

ACKLAND'S TABLES FOR THE SIMPLIFICATION OF EMULSION CALCULATIONS.

No. 1.

	Equivalent weights.	Weight of $AgNO_3$ required to convert one grain of soluble haloid.	Weight of soluble haloid required to convert one grain $AgNO_3$.	Weight of silver haloid produced by one grain of soluble haloid.	Weight of soluble haloid required to produce one grain of silver haloid.	Weight of silver haloid produced from one grain $AgNO_3$.
Ammonium bromide.......	98	1.734	.576	1.918	.521	1.106
Potassium "	119.1	1.427	.700	1.578	.633	
Sodium "	103	1.650	.606	1.825	.548	
Cadmium " com...	172	.988	1.012	1.093	.915	
" " anh....	136	1.25	.800	1.382	.723	
Zinc "	112.1	1.509	.663	1.670	.600	
Ammonium chloride.......	53.5	3.177	.315	2.682	.373	.844
Sodium "	58.5	2.906	.344	2.453	.408	
Ammonium iodide.........	145	1.172	.853	1.620	.617	1.382
Potassium "	166.1	1.023	.977	1.415	.707	
Sodium "	150	1.133	.882	1.566	.638	
Cadmium "	183	.929	1.076	1.284	.778	

Table No. 1 presents the actual weights of haloid or silver, as the case may be, required to convert or combine with one grain of another.

In order to make (say) ten ounces of emulsion by a new formula, which, for the sake of showing the working of the table, we will write down as follows:

Bromide of potassium..........................	150 grains.
Iodide of potassium..........................	10 "
Chloride of ammonium..........................	10 "
Gelatine..........................	200 "

we want to know how much silver nitrate should be employed in sensitizing this mixture. For this purpose we use the first column, in which we find against each haloid the exact quantity of silver nitrate required to fully decompose one grain. Taking, then, the figures we find in column No. 1 against the three salts in the above formula, and multiplying them by the number of grains of each used, we have the following sum:

Potassium bromide......................	$150 \times 1.427 = 214$	Weight silver nitrate required.
" iodide......................	$10 \times 1.023 = 10.23$	
Chloride of ammonium......................	$10 \times 3.177 = 31.77$	

or the total quantity of silver nitrate required for full conversion, 256.00 grains.

Portrait. NEG. BY R. H. FURMAN,
SAN DIEGO, CALIFORNIA.

NEPERA CHEMICAL COMPANY TRADE MARK

Made on "PORTRAIT" VELOX.

PRINTED AND DEVELOPED BY FULL GAS-LIGHT.

ACKLAND'S TABLES FOR THE SIMPLIFICATION OF EMULSION CALCULATIONS.

No. 2.

	Ammonium bromide.	Potassium bromide.	Sodium bromide.	Cadmium bromide. (Coml.)	Cadmium bromide. (Anhyd.)	Zinc bromide.	Ammonium chloride.	Sodium chloride.	Ammonium iodide.	Potassium iodide.	Sodium iodide.	Cadmium iodide.
Ammonium bromide	**1**	.823	.951	.57	.72	.87	1.832	1.675	.676	.59	.653	.535
Potassium "	1.215	**1**	1.156	.692	.876	1.058	2.226	2.036	.821	.717	.794	.651
Sodium "	1.051	.865	**1**	.599	.757	.915	1.925	1.761	.71	.62	.686	.563
Cadmium " com.	1.755	1.444	1.67	**1**	1.265	1.527	3.215	2.94	1.186	1.035	1.146	.94
" " anh.	1.387	1.141	1.32	.79	**1**	1.207	2.542	2.324	.938	.819	.906	.743
Zinc "	1.149	.945	1.093	.655	.828	**1**	2.104	1.925	.776	.678	.75	.615
Ammonium chloride......	.546	.449	.519	.311	.393	.475	**1**	.914	.369	.322	356	.292
Sodium "	.597	.491	.568	.34	.43	.519	1.093	**1**	.403	.352	.39	.319
Ammonium iodide	1.479	1.217	1.408	.843	1.066	1.287	2.712	2.478	**1**	.873	.966	.792
Potassium "	1.695	1.391	1.612	.965	1.221	1.475	3.104	2.839	1.145	**1**	1.107	.907
Sodium "	1.53	1.259	1.456	.872	1.103	1.332	2.803	2.564	1.034	.903	**1**	.819
Cadmium "	1.867	1.536	1.776	1.064	1.345	1.625	3.42	3.128	1.262	1.102	1.22	**1**

TABLE No. 2 gives in separate columns the relative converting values of each of the soluble haloid salts in ordinary use, showing how much of any salt must be used to replace one grain of any other. In each column will be found a unit (printed in larger type) which represents one grain of the salt named at the head of the column; the other figures in the same column show the exact quantities of the other salts which must be used in lieu of a single grain of that particular haloid. Thus, taking the first column, which is headed "Ammonium Bromide," we find against ammonium bromide in the margin the figure 1, representing one grain of that salt. If we wish to know the relative converting power of potassium bromide we take the number in the same column which stands against the latter salt in the margin, viz., 1.215; that is to say, 1.215 grain of potassium bromide will be required to do the same work as one of NH_4 Br.

TABLE OF THE RELATIVE SOLUBILITY OF THE CHLORID, BROMID AND IODID OF SILVER.

From Comptes Rendus des Séances de l' Academie des Sciences de Vienne. E. VALENTA.
Translated by D. W. COLBY, Maine State College, Orono.

SOLVENT.	CONCENTRATION.	100 GRAMMES OF SOLUTION DISSOLVE IN GRMS.			REMARKS.
		Ag Cl	Ag Br	Ag I	
Sodium Thiosulfite.	1:100	0.40	0.35	0.03	The determinations of solubility were made at 20 deg. C.
....	5:100	2.00	1.90	0.15	
....	10:100	4.10	3.50	0.30	
....	15:100	5.50	4.20	0.40	
....	20:100	6 10	5.80	0.60	
Ammonium Thiosulfite.	1:100	0.57	....	....	The bromid and iodid of silver dissolve as in sodium thiosulfite.
....	5:100	1.32	....	....	
....	10:100	3.92	....	....	
Sodium Sulfite.	10:100	0.44	0.04	0.01	at 25 deg. C.
....	20:100	0.95	0.08	0 02	
Ammonium Sulfite.	10:100	traces	traces	traces	
Ammonium Carbonate.	10:100	0.05	....	....	
Ammonia.	3 per ct.	1.40	....	....	
....	15 per ct.	7 58	....	....	
Magnesium Chlorid.	50:100	0.50	....	....	
Potassium Cyanid.	5:100	2.75	6.55	8.23	at 25 deg. C.
Ammonium Sulfocyanid.	5:100	0.08	0.21	0.02	at 20 deg. C.
....	10:100	0.54	2.04	0.08	
....	15:100	2.88	5.30	0.13	
Potassium Sulfocyanid.	10:100	0.11	0.73	....	at 25 deg. C.
Calcium Sulfocyanid.	10:100	0.15	0.53	0.03	
Barium Sulfocyanid.	10:100	0.20	0.35	0.02	
Aluminum Sulfocyanid.	10:100	2.02	4.50	0.02	
Thiocarbamide.	10:100	0.83	1.87	0.79	at 25 deg. C.
Thiosinnamine.	1:100	0.40	0.08	0.08	
....	5:100	1.90	0.35	0.05	
....	10:100	3.90	0.72	0.09	

On looking over these figures one sees immediately, that the chemical equations representing the solution of the haloid salts of silver, do not accord with the facts. The solution of silver chlorid, for example, in sodium thiosulfite should take place after the following equation:

$$Na_2S_2O_3 + 2AgCl = Ag_2S_2O_3 + NaCl$$

The figures given by experiment are not exactly in concordance with the equation. Furthermore in replacing in that formula AgCl by AgBr or AgI we find a still more marked difference, for by the table the silver iodid is nearly ten times less soluble than the chlorid or bromid.

The most energetic solvent for the silver salts is without doubt the cyanid of potassium. This dissolves with great readiness the chlorid, bromid and iodid of silver. In this case also theory does not accord with practice. The solution in cyanid takes place after the following equation:

$$KCy + AgCl\ (Br\ or\ I) = AgCy + KCl\ (Br\ or\ I)$$

The cyanid of potassium acts in a different manner from the sodium thiosulfite. In the thiosulfite the solubility is greatest in the chlorid, diminishing to the iodid; on the contrary for the cyanid it is least for the chlorid, increasing to the iodid.

Following from this it is best to use the potassium cyanid as a fixing agent in case any great amount of the iodid of silver is present.

ELSDEN'S TABLE OF POISONS AND ANTIDOTES.

	Poisons.	Remarks.	Characteristic Symptoms.	Antidote.
Vegetable Acids.	Oxalic Acid. including Potassium Oxalate.	1 dram is the smallest fatal dose known.	Hot, hurning sensation in throat and stomach; vomiting, cramps, and numhness.	Chalk, whiting or magnesia, suspended in water. Plaster or mortar can be used in emergency.
Caustic Alkalies.	Ammonia. Potash. Soda.	Vapor of ammonia may cause inflammation of the lungs.	Swelling of tongue, mouth, and fauces; often followed hy stricture of the œsophagus.	Vinegar and water.
Metallic Salts.	Mercuric Chloride.	3 grains the smallest known fatal dose.	Acrid, metallic taste, constriction and hurning in throat and stomach, followed hy nausea and vomiting.	White and yolk of raw eggs with milk. In emergency, flour paste may be used.
	Acetate of Lead.	The suh-acetate is still more poisonous.	Constriction in the throat and at pit of stomach; crampy pains and stiffness of abdomen; blue line round the gums.	Sulphates of soda or magnesia. Emetic of sulphate of zinc.
	Cyanide of Potassium.	*a*. Taken internally, 3 grs. fatal.	Insensibility, slow, gasping respiration, dilated pupils, and spasmodic closure of the jaws.	No certain remedy; cold affusion over the head and neck most efficacious.
		b. Applied to wounds and abrasures of the skin.	Smarting sensation.	Sulphate of iron should he applied immediately.
	Bichromate of Potassium	*a*. Taken internally. *b*. Applied to slight ahrasions of the skin.	Irritant pain in stomach, and vomiting. Produces trouhlesome sores and ulcers.	Emetics and magnesia, or chalk.
	Nitrate of Silver.		Powerful irritant.	Common salt to be given immediately, followed hy emetics.
Concentrated Mineral Acids.	Nitric Acid.	2 drams have been fatal. Inhalation of the fumes has also been fatal.	Corrosion of windpipe and violent inflammation.	Bicarbonate of soda, or carhonate of magnesia or chalk, plaster of the apartment beaten up in water.
	Hydrochloric Acid.	½ ounce has caused death.		
	Sulphuric Acid.	1 dram has been fatal.		
	Acetic Acid, concentrated, has as powerful an effect as the mineral acids.			
	Iodine.	Variable in its action; 3 grains have been fatal.	Acrid taste, tightness about the throat, vomiting.	Vomiting should be encouraged, and gruel, arrowroot and starch given freely.
	Ether.	When inhaled.	Effects similar to chloroform.	Cold affusion and artificial respiration.
	Pyrogallol.	2 grains sufficient to kill a dog.	Resemhle phosphorus poisoning.	No certain remedy. Speedy emetic desirable.

UNITED STATES WEIGHTS AND MEASURES.

ACCORDING TO EXISTING STANDARDS.

LINEAL.

12 inches = 1 foot.
3 feet = 1 yard.
5.5 yards = 1 rod.
40 rods = 1 furlong.
8 furlongs = 1 mile.

Inches.		Feet.		Yards.		Rods.		Fur's.		Mile.
12	=	1								
36	=	3	=	1						
198	=	16.5	=	5.5	=	1				
7,920	=	660	=	220	=	40	=	1		
63,360	=	5,280	=	1,760	=	320	=	8	=	1

SURFACE—LAND.

144 sq. ins. = 1 sq. ft.
9 sq. ft. = 1 sq. yard.
30.25 sq. yds. = 1 sq. rod.
40 sq. rods = 1 sq. rood.
4 sq. roods = 1 acre.
640 acres = 1 sq. mile.

Feet.		Yards.		Rods.		Roods.		Acres.
9	=	1						
272.25	=	30.25	=	1				
10,890	=	1,210	=	40	=	1		
43,560	=	4,840	=	160	=	4	=	1
27,878,400	=	3,097,600	=	102,400	=	2,560	=	640

VOLUME—LIQUID.

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon.

Gills.		Pints.		Gallon.		Cub. In.
32	=	8	=	1	=	231

FLUID.

Gallon.		Pints.		Ounces.		Drachms.		Minims.		Cubic Centimetres.
1	=	8	=	128	=	1,024	=	61,440	=	3,785.435
		1	=	16	=	128	=	7,680	=	473.179
				1	=	8	=	480	=	29.574
						1	=	60	=	3.697

16 ounces, or a pint, is sometimes called a fluid pound.

TROY WEIGHT.

Pound.		Ounces.		Pennyweights.		Grains.		Grams.
1	=	12	=	240	=	5,760	=	373.24
		1	=	20	=	480	=	31.10
				1	=	24	=	1.56

APOTHECARIES' WEIGHT.

lb. Pound.		℥ Ounces.		ʒ Drachms.		℈ Scruples.		gr. Grains.		Grams.
1	=	12	=	96	=	288	=	5,760	=	373.24
		1	=	8	=	24	=	480	=	31.10
				1	=	3	=	60	=	3.89
						1	=	20	=	1.30
								1	=	.06

The pound, ounce, and grain are the same as in Troy weight.

AVOIRDUPOIS WEIGHT.

Pound.		Ounces.		Drachms.		Grains (Troy).		Grams.
1	=	16	=	256	=	7,000	=	453.60
		1	=	16	=	437.5	=	28.35
				1	=	27.34	=	1.77

ENGLISH WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHT.

20 Grains	= 1 Scruple =	20 Grains.
3 Scruples	= 1 Drachm =	60 Grains.
8 Drachms	= 1 Ounce =	480 Grains.
12 Ounces	= 1 Pound =	5760 Grains.

FLUID MEASURE.

60 Minims	= 1 Fluid Drachm
8 Drachms	= 1 Fluid Ounce.
20 Ounces	= 1 Pint.
8 Pints	= 1 Gallon.

The above weights are usually adopted in formulas.

All Chemicals are usually sold by

AVOIRDUPOIS WEIGHT.

$27\frac{11}{32}$	Grains = 1 Drachm =	$27\frac{11}{32}$	Grains.
16	Drachms = 1 Ounce =	$437\frac{1}{2}$	Grains.
16	Ounces = 1 Pound =	7000	Grains.

Precious Metals are usually sold by

TROY WEIGHT.

24 Grains	= 1 Pennyweight =	24 Grains.
20 Pennyweights	= 1 Ounce =	480 Grains.
12 Ounces	= 1 Pound =	5760 Grains.

NOTE.—An ounce of metallic silver contains 480 grains, but an ounce of nitrate of silver contains only $437\frac{1}{2}$ grains.

UNITED STATES FLUID MEASURE.

Gal.	Pints.	Ounces.	Drachms.	Mins.	Cub. In.	Grains.	Cub. C.M.
1 =	8 =	128 =	1,024 =	61,440 =	231. =	58,328.886 =	3,785.44
	1 =	16 =	128 =	7,680 =	28.875 =	7,291.1107 =	473.18
		1 =	8 =	480 =	1.8047 =	455.6944 =	29.57
			1 =	60 =	0.2256 =	56.9618 =	3.70

IMPERIAL BRITISH FLUID MEASURE.

Gal.	Pints.	Ounces.	Drachms.	Mins.	Cub. In.	Grains.	Cub. C.M.
1 =	8 =	160 =	1,280 =	76,800 =	277.27384 =	70,000 =	4,543.732
	1 =	20 =	160 =	9,600 =	34.65923 =	8,750 =	567.966
		1 =	8 =	480 =	1.73296 =	437.5 =	28.398
			1 =	60 =	0.21662 =	54.69 =	3.550

METRIC SYSTEM OF WEIGHTS AND MEASURES.

MEASURES OF LENGTH.

Denominations and Values.		Equivalents in Use.	
Myriameter	10,000 meters.	6.2137	miles.
Kilometer	1,000 meters.	.62137	mile, or 3,280 ft. 10 ins.
Hectometer	100 meters.	328.	feet and 1 inch.
Dekameter	10 meters.	393.7	inches.
Meter	1 meter.	39.37	inches.
Decimeter	1-10th of a meter.	3.937	inches.
Centimeter	1-100th of a meter.	.3937	inch.
Millimeter	1-1000th of a meter.	.0394	inch.

MEASURES OF SURFACE.

Denominations and Values.		Equivalents in Use.	
Hectare	10,000 square meters.	2.471	acres.
Are	100 square meters.	119.6	square yards.
Centare	1 square meter.	1,550.	square inches.

MEASURES OF VOLUME.

Denominations and Values.			Equivalents in Use.	
Names.	No. of Liters.	Cubic Measures.	Dry Measure.	Wine Measure.
Kiloliter or stere	1,000	1 cubic meter.	1.308 cubic yards.	264.17 gallons.
Hectoliter	100	1-10th cubic meter.	2 bu. and 3.35 pecks.	26.417 gallons.
Dekaliter	10	10 cubic decimeters.	9.08 quarts.	2.6417 gallons.
Liter	1	1 cubic decimeter.	.908 quart.	1.0567 quarts.
Deciliter	1-10	1-10th cubic decimeter.	6.1023 cubic inches.	.845 gill.
Centiliter	1-100	10 cubic centimeters.	.6102 cubic inch.	.338 fluid oz.
Milliliter	1-1000	1 cubic centimeter.	.061 cubic inch.	.27 fl. drm.

WEIGHTS.

Denominations and Values.			Equivalents in Use.
Names.	Number of Grams.	Weight of Volume of Water at its Maximum Density.	Avoirdupois Weight.
Millier or Tonneau	1,000,000	1 cubic meter.	2204.6 pounds.
Quintal	100,000	1 hectoliter.	220.46 pounds.
Myriagram	10,000	10 liters.	22.046 pounds.
Kilogram or Kilo	1,000	1 liter.	2.2046 pounds.
Hectogram	100	1 deciliter.	3.5274 ounces.
Dekagram	10	10 cubic centimeters.	.3527 ounce.
Gram	1	1 cubic centimeter.	15.432 grains.
Decigram	1-10	1-10th of a cubic centimeter.	1.5432 grain.
Centigram	1-100	10 cubic millimeters.	.1543 grain.
Milligram	1-1000	1 cubic millimeter.	.0154 grain.

For measuring surfaces, the square dekameter is used under the term of ARE; the hectare, or 100 ares, is equal to about 2½ acres. *The unit of capacity* is the cubic decimeter or LITER, and the series of measures is formed in the same way as in the case of the table of lengths. The cubic meter is the unit of measure for solid bodies, and is termed STERE. *The unit of weight* is the GRAM, which is the weight of one cubic centimeter of pure water weighed in a vacuum at the temperature of 4 deg. Cent. or 39.2 deg. Fahr., which is about its temperature of maximum density. In practice, the term cubic centimeter, abbreviated c.c., is generally used instead of milliliter, and cubic meter instead of kiloliter.

METRIC SYSTEM OF WEIGHTS AND MEASURES.

THE meter is a measure of length equal to 39.370 English or American inches, a standard of linear measure supposed to be the ten-millionth part of the distance from the equator to the north pole, as ascertained by actual measurement of an arc of the meridian.

This system, formed on the meter as the unit of length, has four other leading units, all connected with and dependent upon this. Hence, we have:

1. The meter, which is the unit of measures of length.

2. The are, which is the unit of surface, and is the square of the meter.

3. The liter, which is the unit of measures of capacity, and is the cube of a tenth part of the meter.

4. The stere, which is the unit of measures of solidity, having the capacity of a cubic meter.

5. The gram, which is the unit of measures of weight, and is the weight of that quantity of distilled water at its maximum density, fills the cube of a hundredth part of the meter.

Each unit has its decimal multiples and sub-multiples, that is weights and measures ten times larger, or ten times smaller, than the principal units. The prefixes denoting multiples are derived from the Greek, and are: Deka, ten; hecto, hundred; kilo, thousand; and myria, ten thousand. Those denoting sub-multiples are taken from the Latin, and are: Deci, ten; centi, hundred (as in centigram or centimeter); and milli, thousand.

The metric system has been adopted by many nations, the English excepted. In America its use has been made optional, but is legalized by Congress. All photographic formulas received from the continent of Europe express values and quantities with metrical weights and measures. To utilize them directly without translating into the expressions of the English system, the student is advised to procure gram weights and cubic centimeter graduates, and substitute them for those denoting quantities according to the old plan.

As an assistance to those who cannot acquire these aids, we annex tables, which convert grams and cubic centimeters into English grains, drachms, and ounces sufficiently correct for practical purposes.

METRIC FLUID MEASURES.

The cubic centimeter, usually represented by "C.c.," is the unit of the metric measurement for liquids. It contains 17 minims of water. The weight of this quantity of water is 1 gram. The following table will prove to be sufficiently accurate for photographic purposes:

THE CONVERSION OF FRENCH (METRIC) INTO ENGLISH MEASURE.

1 cubic centimeter	=	17 minims.								
1 cubic centimeters	=	34	"							
3 "	=	51	"							
4 "	=	68	"	or 1 dram	8 minims.					
5 "	=	85	"	" 1 "	25 "					
6 "	=	101	"	" 1 "	41 "					
7 "	=	118	"	" 1 "	58 "					
8 "	=	135	"	" 2 drams	15 "					
9 "	=	152	"	" 2 "	32 "					
10 "	=	169	"	" 2 "	49 "					
20 "	=	338	"	" 5 "	38 "					
30 "	=	507	"	" 1 ounce	0 dram	27 minims				
40 "	=	676	"	" 1 "	3 drams	16 "				
50 "	=	845	"	" 1 "	6 "	5 "				
60 "	=	1014	"	" 2 ounces	0 "	54 "				
70 "	=	1183	"	" 2 "	3 "	43 "				
80 "	=	1352	"	" 2 "	6 "	32 "				
90 "	=	1521	"	" 3 "	1 "	21 "				
100 "	=	1690	"	" 3 "	4 "	10 "				
1000 "	=	1 liter = 34 fluid ounces nearly, or $2\frac{1}{8}$ pints.								

THE CONVERSION OF FRENCH (METRIC) INTO ENGLISH WEIGHT.

The following table, which contains no error greater than one-tenth of a grain, will suffice for most practical purposes:

1 gram	=	$15\frac{2}{5}$ grains.			
2 grams	=	$30\frac{4}{5}$ "			
3 "	=	$46\frac{1}{5}$ "			
4 "	=	$61\frac{4}{5}$ "	.... or	1 dram	$1\frac{4}{5}$ grain.
5 "	=	$77\frac{1}{5}$ "	.... "	1 "	$17\frac{1}{5}$ grains.
6 "	=	$92\frac{3}{5}$ "	.... "	1 "	$32\frac{3}{5}$ "
7 "	=	108 "	.... "	1 "	48 "
8 "	=	$123\frac{2}{5}$ "	.... "	2 drams	$3\frac{2}{5}$ "
9 "	=	$138\frac{4}{5}$ "	.... "	2 "	$18\frac{4}{5}$ "
10 "	=	$154\frac{2}{5}$ "	.... "	2 "	$34\frac{2}{5}$ "
11 "	=	$169\frac{4}{5}$ "	.... "	2 "	$49\frac{4}{5}$ "
12 "	=	$185\frac{1}{5}$ "	.... "	3 "	$5\frac{1}{5}$ "
13 "	=	$200\frac{3}{5}$ "	.... "	3 "	$20\frac{3}{5}$ "
14 "	=	216 "	.... "	3 "	36 "
15 "	=	$231\frac{2}{5}$ "	.... "	3 "	$51\frac{2}{5}$ "
16 "	=	247 "	.... "	4 "	7 "
17 "	=	$262\frac{2}{5}$ "	.... "	4 "	$22\frac{2}{5}$ "
18 "	=	$277\frac{4}{5}$ "	.... "	4 "	$37\frac{4}{5}$ "
19 "	=	$293\frac{1}{5}$ "	.... "	4 "	$53\frac{1}{5}$ "
20 "	=	$308\frac{3}{5}$ "	.... "	5 "	$8\frac{3}{5}$ "
30 "	=	463 "	.... "	7 "	43 "
40 "	=	$617\frac{1}{5}$ "	.... "	10 "	$17\frac{1}{5}$ "
50 "	=	$771\frac{3}{5}$ "	.... "	12 "	$51\frac{3}{5}$ "
60 "	=	926 "	.... "	15 "	26 "
70 "	=	$1080\frac{1}{5}$ "	.... "	18 "	$0\frac{1}{5}$ "
80 "	=	$1234\frac{3}{5}$ "	.... "	20 "	$34\frac{3}{5}$ "
90 "	=	1389 "	.... "	23 "	9 "
100 "	=	$1543\frac{1}{5}$ "	.... "	25 "	$43\frac{1}{5}$ "
1000 "	=	1 kilogram = 32 oz., 1 dr., $12\frac{2}{5}$ gr.			

THE CONVERSION OF METRIC INTO AMERICAN MEASURE.

By Nelson B. Sizer, B.Sc., M.D.

[From *The Photographic Times*, August 14, 1891.]

The following table is computed true to the nearest half grain or minim, as the case may be, so it will prove a sufficiently near approximation to the required metric equivalents.

U. S. P. Standard.

Gram, or c.cm.	Grains.	Minims.	Gram, or c.cm.	Grains.	Minims.
1	15½	16¼	15	231½	244
2	31	32½	16	247	260
3	46	49	17	262	276
4	62	65	18	278	292½
5	77	81	19	293	309
6	93	97½	20	308½	325
7	108	114	30	463	487½
8	123½	130	40	617	650
9	139	146	50	771½	813
10	154	162½	60	926	975½
11	170	179	70	1,080	1,138
12	185	194	80	1,234½	1,300½
13	201	211	90	1,389	1,463
14	216	227½	100	1,543	1,625½
..	....	.. .	1,000	15,432⅓	16,256⅓
..	....	....	....	1 kilo.	liter.

The "kilo" or kilogram, the 1,000 gram weight, is equal to 32 ounces $72\frac{2}{10}$ grains "Troy or Apothecaries" weight, or 2 pounds 3 ounces $119\frac{7}{10}$ grains Avoirdupois.

The "liter" or 1,000 cubic centimeters, or bulk of water that weighs 1 kilo, is equal to 2 pints 1 fluid ounce and $415\frac{3}{10}$ minims, U. S. P. Standard, or our glass graduates as commonly sold by reliable houses.

The grains and minims are easily reduced to fluid drachms and fluid ounces, or drachms and ounces Troy, by my readers, if they will only remember that 60 grains or minims go to the solid or fluid drachm, and 480 grains or minims, or 8 drachms solid or fluid, go to each U. S. P. ounce, solid or fluid.

Thus the table gives the value of 90 grams as 1,389 grains, of 90 cubic centimeters as 1,463 minims. How many ounces in each?

Dividing 1,389 by 60 for drachms, we have 23 drachms 9 grains. As 8 drachms go to the ounce, there are 2 ounces in the 23 drachms and 7 drachms over, so we have—in 1,389 grains there are 2 ounces 7 drachms 9 grains. In the same way we find 3 fluid ounces and 23 minims over, to be the value of 90 cubic centimeters or 1,463 minims.

TABLE SHOWING THE COMPARISON OF THE READINGS OF THERMOMETERS.

CELSIUS, OR CENTIGRADE (C). RÉAUMUR (R). FAHRENHEIT (F).

C.	R.	F.	C.	R.	F.
—30	—24.0	—22.0	23	18.4	73.4
—25	—20.0	—13.0	24	19.2	75.2
—20	—16.0	— 4.0	25	20.0	77.0
—15	—12.0	+ 5 0	26	20.8	78.8
—10	— 8.0	14.0	27	21.6	80.6
— 5	— 4.0	23.0	28	22.4	82 4
— 4	— 3.2	24.8	29	23 2	84.2
— 3	— 2.4	26.6	30	24.0	86.0
— 2	— 1.6	28.4	31	24.8	87.8
— 1	— 0.8	30.2	32	25.6	89.6
			33	26.4	91.4
Freezing point of water.			34	27.2	93.2
			35	28.0	95.0
0	0.0	32.0	36	28.8	96.8
1	0.8	33.8	37	29.6	98.6
2	1.6	35.6	38	30.4	100.4
3	2.4	37.4	39	31.2	102.2
4	3.2	39.2	40	32.0	104.0
5	4.0	41.0	41	32.8	105.8
6	4.8	42.8	42	33.6	107.6
7	5.6	44.6	43	34.4	109.4
8	6.4	46.4	44	35.2	111.2
9	7.2	48.2	45	36.0	113.0
10	8.0	50.0	50	40.0	122.0
11	8.8	51.8	55	44.0	131.0
12	9.6	53.6	60	48.0	140.0
13	10.4	55.4	65	52.0	149.0
14	11.2	57.2	70	56.0	158.0
15	12.0	59.0	75	60.0	167.0
16	12.8	60.8	80	64.0	176.0
17	13.6	62.6	85	68.0	185.0
18	14.4	64.4	90	72.0	194.0
19	15.2	66.2	95	76.0	203.0
20	16.0	68.0	100	80.0	212.0
21	16.8	69.8			
22	17.6	71.6	Boiling point of water.		

Readings on one scale can be changed into another by the following formulæ, in which t° indicates degrees of temperature:

Réau. to Fahr.

$$\frac{9}{4}t^\circ \text{ R} + 32^\circ = t^\circ \text{ F}$$

Cent. to Fahr.

$$\frac{9}{5}t^\circ \text{ C} + 32^\circ = t^\circ \text{ F}$$

Fahr. to Cent.

$$\frac{5}{9}\left(t^\circ \text{ F} - 32^\circ\right) = t^\circ \text{ C}$$

Réau. to Cent.

$$\frac{5}{4}t^\circ \text{ R} = t^\circ \text{ C}$$

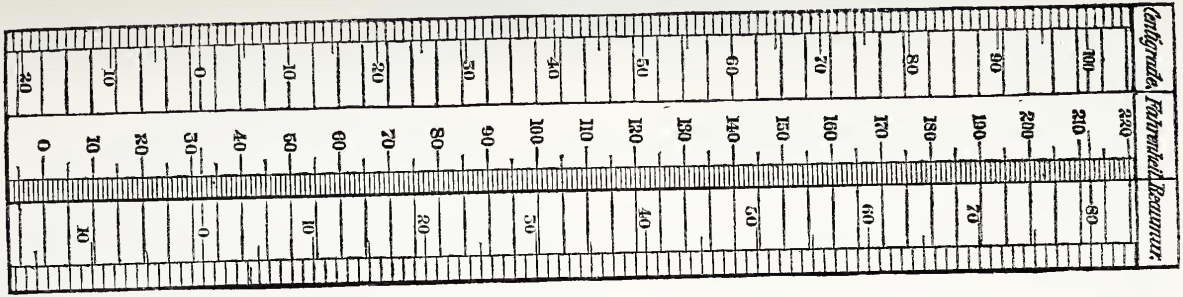
Cent. to Réau.

$$\frac{4}{5}t^\circ \text{ C} = t^\circ \text{ R}$$

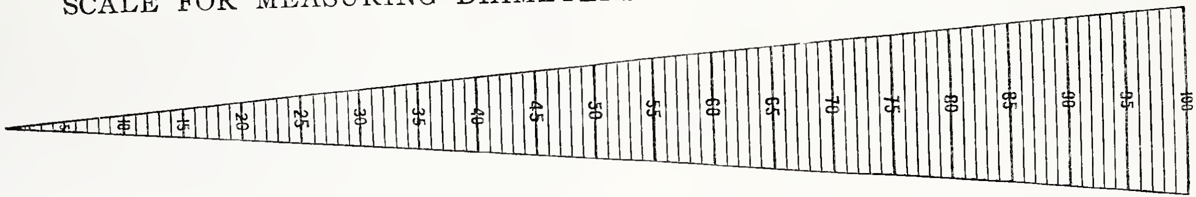
Fahr. to Réau.

$$\frac{4}{9}\left(t^\circ \text{ F} - 32\right) = t^\circ \text{ R}$$

THERMOMETER SCALES.



SCALE FOR MEASURING DIAMETERS OF STOPS FOR LENSES.



Each cross line varies in length from the adjacent one by $\frac{1}{100}$th of an inch.

To use: Lay the stop flat on this scale, and select the cross line which is of the same length as the greatest diameter of the opening; read this off, by means of the figures, which will be the measurements in $\frac{1}{100}$ths of an inch. The equivalent focal length of lens, divided by this measurement of the stop opening, will give the fraction expressing the ratio of aperture to focal length. The rapidity of different lenses, or of the same lens with different stops, is proportional to the squares of these ratios.

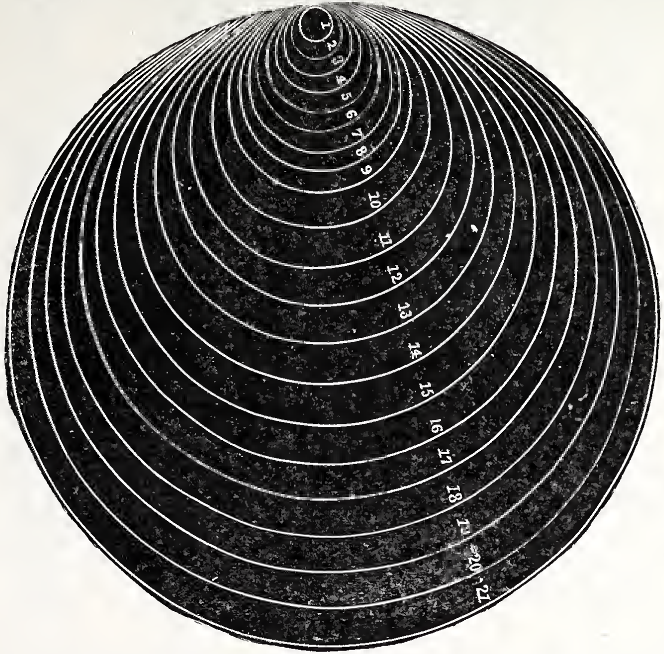
"UNIFORM SYSTEM" NUMBERS FOR STOPS FROM $\frac{f}{1}$ TO $\frac{f}{100}$.

In the following table Mr. S. A. Warburton has calculated the exposure necessary with every stop from $\frac{f}{1}$ to $\frac{f}{100}$ compared with the unit stop of the "uniform system" of the Photographic Society of Great Britain. The figures which are underlined show in the first column what $\frac{f}{a}$ must be in order to increase the exposure in geometrical ratio from $\frac{f}{4}$, the intermediate numbers showing the uniform system number for any other aperture.

f	U. S. No.	*f*	U. S. No.	*f*	U. S. No.
1	$\frac{1}{16}$	15	14.06	58	210.25
1¼	.097	16	16	59	217.56
1.414	⅛	17	18.06	60	225.00
1½	.140	18	20.25	61	232.56
1¾	.191	19	22.56	62	240.25
2	¼	20	25.00	63	248.06
2¼	.316	21	27.56	64	256
2½	.390	22	30.25	65	264.06
2.828	½	22.62	32	66	272.25
2¾	.472	23	33.06	67	280.56
3	.562	24	36.00	68	289.00
3¼	.660	25	39.06	69	297.56
3½	.765	26	42.25	70	306.25
3¾	.878	27	45.56	71	315.06
4	1.00	28	49.00	72	324.00
4¼	1.12	29	52.56	73	333.06
4½	1.26	30	56.25	74	342.25
4¾	1.41	31	60.06	75	351.56
5	1.56	32	64	76	361.00
5¼	1.72	33	68.06	77	370.56
5½	1.89	34	72.25	78	380.25
5.656	2	35	76.56	79	390.06
5¾	2.06	36	81.00	80	400.00
6	2.25	37	85.56	81	410.06
6¼	2.44	38	90.25	82	420.25
6½	2.64	39	95.06	83	430.56
6¾	2.84	40	100.00	84	440.00
7	3.06	41	105.06	85	451.56
7¼	3.28	42	110.25	86	462.25
7½	3.51	43	115.56	87	473.06
7¾	3.75	44	121.00	88	484.00
8	4	45	126.56	89	495.06
8¼	4.25	45.25	128	90	506.25
8½	4.51	46	132.25	90.50	512
8¾	4.78	47	138.06	91	517.56
9	5.06	48	144.00	92	529.00
9¼	5.34	49	150.06	93	540.56
9½	5.64	50	156.25	94	552.25
9¾	5.94	51	162.56	95	564.06
10	6.25	52	169.00	96	576.00
11	7.56	53	175.56	97	588.06
11.31	8	54	182.25	98	600.25
12	9.00	55	189.06	99	612.56
13	10.56	56	196.00	100	625.00
14	12.25	57	203.06		

THE PHOTOGRAPHIC SOCIETY'S (OF GREAT BRITAIN) STANDARD DIAPHRAGMS.

The annexed diagram and table are intended to facilitate the calculation of the proper number with which to mark the diaphragms according to the Photographic Society of Great Britain's Uniform System, which will be found described on another page. This number it is proposed to call the "U. S." (or uniform system number). The numbered circles in the diagram represent the sizes of stops. The photographer, knowing the equivalent focus of his lens, looks along the line opposite the number which represents the circle nearest inside to his diaphragm, and when he gets to the column headed by that equivalent focus the number there found is the U. S. number to be marked on the diaphragm. For example: A lens of eight inches equivalent focus has a diaphragm in size about No. 5 on the diaphragm; running the eye along the line opposite No. 5 we find in the column under—"focus eight inches" the No. 11, which is the U. S. number required.



No. of Circle.	4 focus	5 focus	6 focus	7 focus	8 focus	9 focus	10 focus	12 focus	14 focus
1	25	39	56						
2	11	17	25	34	44	56	68		
3	6¼	10	14	19	25	31	40	56	
4	4	6¼	9	12	16	20	25	36	48
5	2¾	4¼	6¼	8½	11	14	17	25	34
6	2	3⅕	4½	6¼	8	10	13	18	25
7	1½	2½	3½	4¾	6	8	10	14	19
8	1¼	2	2¾	3¾	5	6¼	8	11	15
9	1	1½	2¼	3	4	5	6¼	9	12¼
10		1	1½	2⅛	2¾	3½	4⅓	6	8½
11			1¼	1½	2	2½	3⅕	5	6
12			⅞	1⅕	1½	2	2½	3½	4¾
13				1	1¼	1⅚	1⅔	2¾	4
14					1	1¼	1½	2¼	3
15						1	1⅓	1⅞	2½
16							1	1½	2
17								1⅓	7⅔
18								1⅙	1½
19								1	1⅓
20									1⅕
21									1

Note.—This table, taken from the "British Journal Photographic Almanac," has proved to be very convenient in the calculating of stop values.

EQUATIONS RELATING TO FOCI.

The following simple optical formulas and calculations, worked out by Mr. J. A. C. Branfill, for the *British Journal Almanac*, will prove useful in many branches of photography, especially where several lenses of varying foci are in constant use for a variety of purposes:

p = Principal focus.
F = Greater conjugate focus.
f = Lesser conjugate focus.
r = Ratio of any dimension in original to the same dimensions in copy (in case of reduction), or *vice versa* (in case of enlargement).
a = Diameter of aperture to lens.
x = Exposure required, assuming that $x = 1$ when $a = \frac{p}{4}$.

$$p = \frac{r(F+f)}{(r+1)^2}$$

$$f = p\left(\frac{1+r}{r}\right) = \frac{F+f}{r+1}$$

$$F = p(r+1) = rf$$

$$F+f = p \times \frac{(r+1)^2}{r} = p\left(2 + r + \frac{1}{r}\right)$$

$$r = \frac{F-p}{p} = \frac{p}{f-p} = \frac{F}{f}$$

$$x = \frac{f^2}{16\,a^2}$$

N. B.—For ordinary landscape work, where r is greater than 20, x may be taken as $\frac{p^2}{16\,a^2}$

NOTE.—In case the above may not be clear to some photographers, the following rules may be better understood:

To find the principal focus of a lens (p), focus a near object in the camera, and measure the distance between it and the ground glass ($F+f$); next find the proportion which any dimension in the object bears to the same dimension on the ground glass (r). Thus, if the original dimension be four times as large as its reproduction, we say that r equals (=) 4. Multiply $F+f$ by r, and divide the product by the square of a number greater by one than r, that is by $(r+1)^2$. This rule was lately published by Mr. Debenham.

To find the lesser conjugate focus (f) (if p and r are known), multiply p by the sum of $r+1$ and divide the product by r. Or divide $F+f$ by $r+1$.

To find the greater conjugate focus (F) multiply p by $r+1$. Or multiply f by r.

To find $F+f$ (the distance which the ground glass should be from the object to be copied in order to get a given value for r) multiply p by the sum of $r + \frac{1}{r} + 2$.

To find r divide $F-p$ (the difference between F and p) by p. Or divide p by $f-p$. Or divide F by f.

To find x divide the square of f by 16 times the square of a (the diameter of aperture to lens).

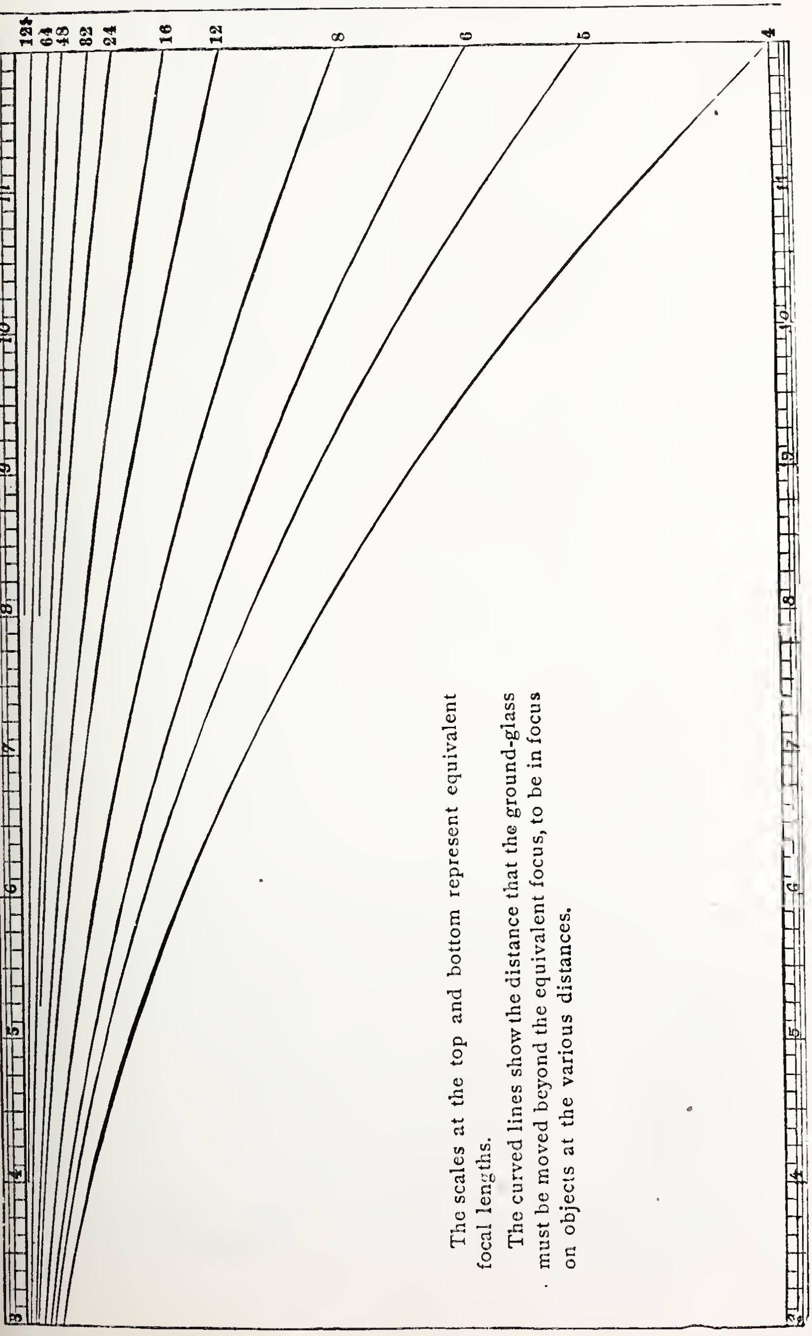
For example Focus an object which is five inches high, so that it is one inch high on the ground glass; thus we know that $r = 5$. Next measure the distance between the object and the ground glass ($F+f$), which is found to be 45 inches.

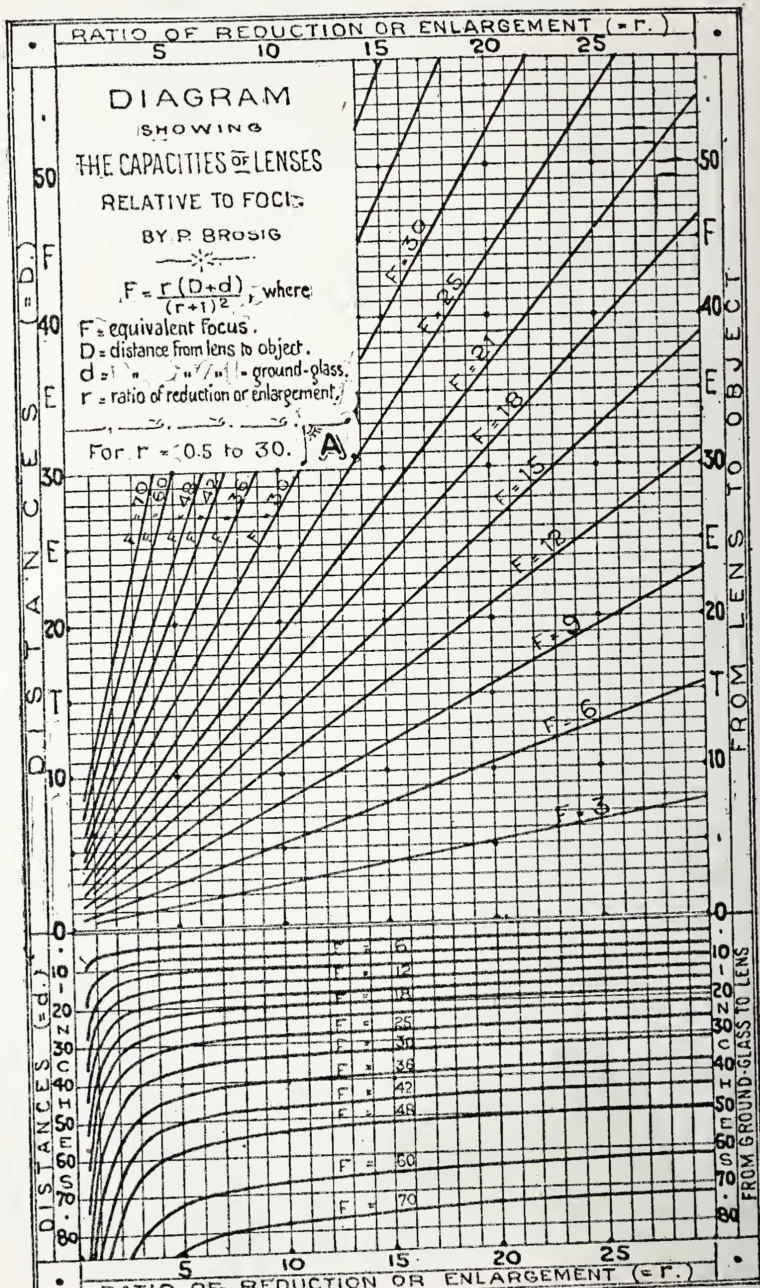
Then $p = 45 \times$ (multiplied by) $5 \div$ (divided by) $6 \times 6 = 6\frac{1}{4}$ inches.
$f = 6\frac{1}{4} \times 6 \div 5 = 7\frac{1}{2}$ inches. Or $f = 45 \div 6 = 7\frac{1}{2}$ inches.
$F = 6\frac{1}{4} \times 6 = 37\frac{1}{2}$ inches. Or $F = 7\frac{1}{2} \times 5 = 37\frac{1}{2}$ inches.
$F+f = 6\frac{1}{4} \times (5 + \frac{1}{5} + 2) = 6\frac{1}{4} \times 7\frac{1}{5} = 45$ inches.
$r = (37\frac{1}{2} - 6\frac{1}{4}) \div 6\frac{1}{4} = 5$. Or $r = 6\frac{1}{4} \div (7\frac{1}{2} - 6\frac{1}{4}) = 5$.

And x (the exposure required) will be $7\frac{1}{2} \times 7\frac{1}{2} \div (16 \times \frac{9}{16}) = 6\frac{1}{4}$; that is, the exposure will be $6\frac{1}{4}$ times as much as the exposure required with an aperture whose diameter equals $p \div 4$, assuming the aperture (a) to be $\frac{3}{4}$ inch diameter.

FOCUSING SCALES FOR ANY LENS OF FROM 3 TO 12 INCHES EQUIVALENT FOCUS.

Drawn by W. T. WINTRINGHAM.





RATIO OF REDUCTION OR ENLARGEMENT (= r.)
DIAGRAM
SHOWING
THE CAPACITIES OF LENSES
RELATIVE TO FOCI.
BY P. BROSIG
F = r(D+d) / (r+1)², where
F = equivalent focus.
D = distance from lens to object.
d = " " " " ground-glass.
r = ratio of reduction or enlargement.
For r = 0.5 to 30.
A
DISTANCES (= D.)
DISTANCES FROM LENS TO OBJECT
DISTANCES (= d.) INCHES
INCHES FROM GROUND-GLASS TO LENS
F = 3
F = 6
F = 9
F = 12
F = 15
F = 18
F = 21
F = 25
F = 30
F = 6
F = 12
F = 18
F = 25
F = 30
F = 36
F = 42
F = 48
F = 60
F = 70
·RATIO OF REDUCTION OR ENLARGEMENT (= r.)

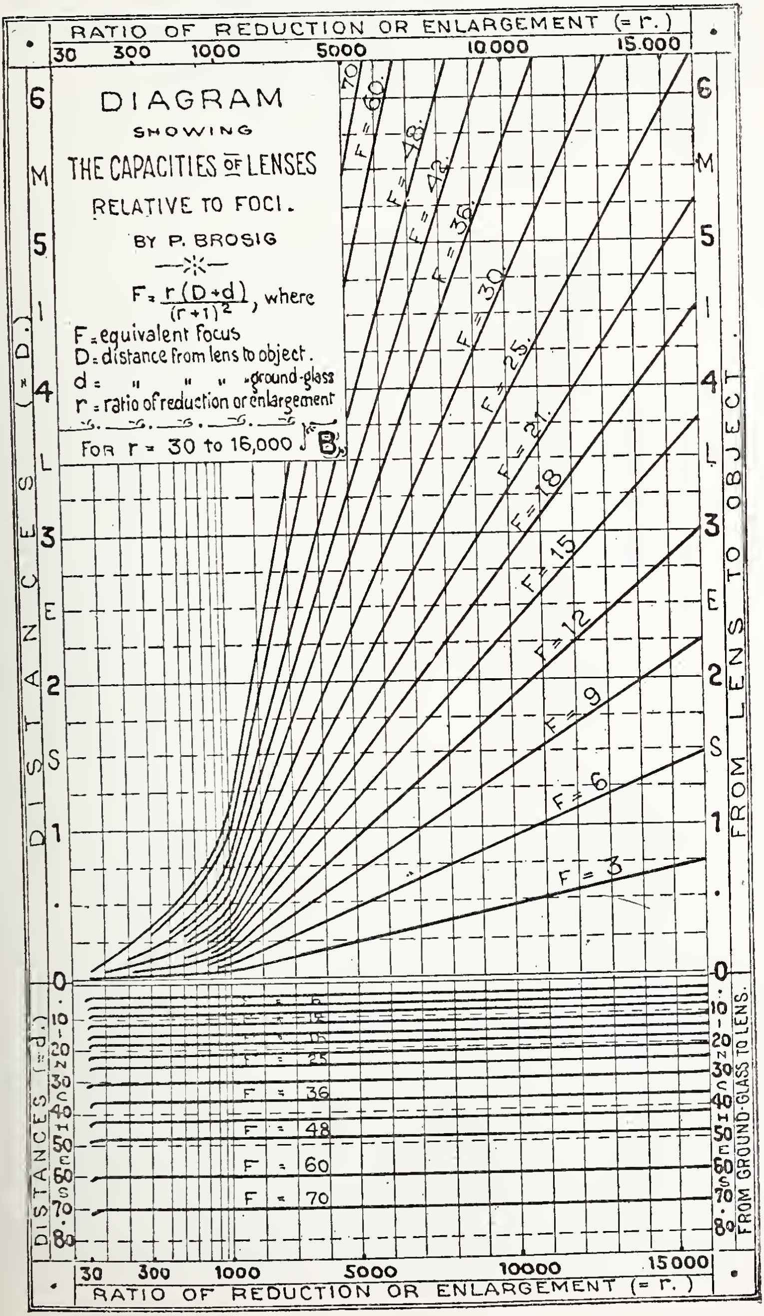

RATIO OF REDUCTION OR ENLARGEMENT (= r.)
30 300 1000 5000 10.000 15.000
DIAGRAM
SHOWING
THE CAPACITIES OF LENSES
RELATIVE TO FOCI.
BY P. BROSIG
F = r(D+d) / (r+1)², where
F = equivalent focus
D = distance from lens to object.
d = " " " ground-glass
r = ratio of reduction or enlargement
FOR r = 30 to 16,000
DISTANCES (= D.)
FROM LENS TO OBJECT.
F = 70
F = 60
F = 48
F = 42
F = 36
F = 30
F = 25
F = 21
F = 18
F = 15
F = 12
F = 9
F = 6
F = 3
6 M 5 I 4 L 3 E 2 S 1 0
10 20 30 40 50 60 70 80
DISTANCES (= d.)
FROM GROUND-GLASS TO LENS.
F = 36
F = 48
F = 60
F = 70
30 300 1000 5000 10000 15000
RATIO OF REDUCTION OR ENLARGEMENT (= r.)

DIAGRAM SHOWING THE RELATIONS BETWEEN

FOCUS, DIAPHRAGM & DISTANCE,

when the depth of focus becomes infinite and when all objects are in focus.

BASED ON CIRCLE OF CONFUSION OF 1/120 INCH. DIAM.

$$D = \frac{10}{n} F^2$$

BY P. BROSIG.

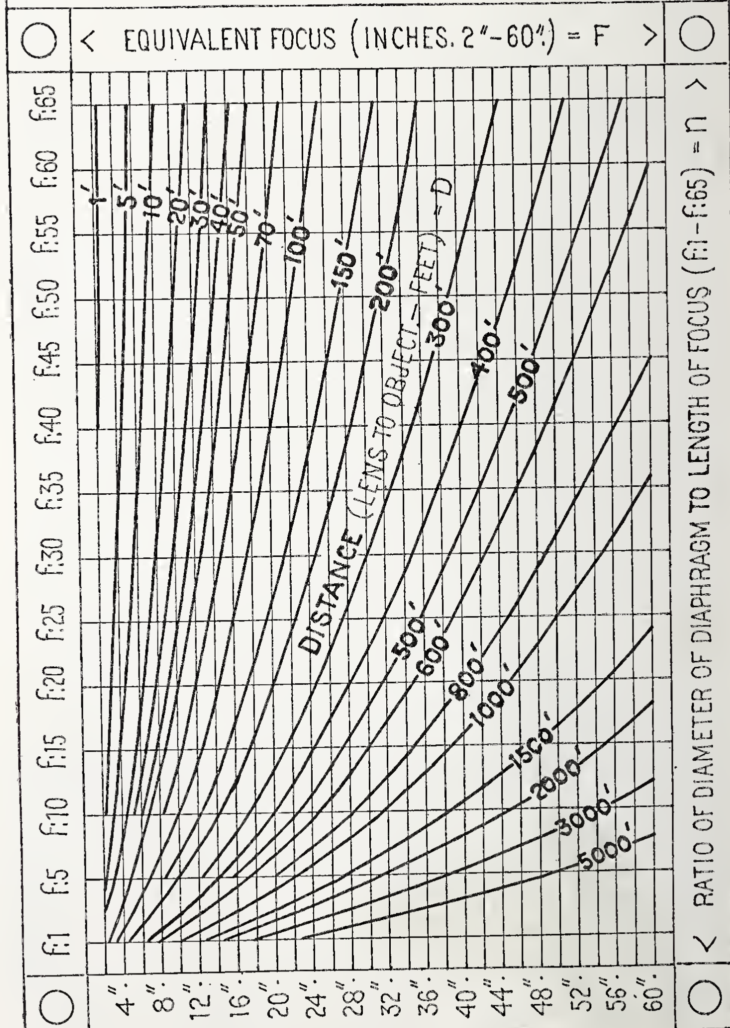


TABLE OF CONJUGATE FOCI, COMPUTED BY P. BROSIG, FOR AN OBJECT OF 68 INCHES HEIGHT.

EQUIV. FOCUS OF LENS INCHES.	HEIGHTS OF IMAGES (INCHES). 1″	2″	3″	4″	5″	6″	7″	8″	10″	12″	16″	20″	28″	36″	44″	52″	60″	68″
2″	138 / 2.0	70 / 2.1	47.3 / 2.1	36 / 2.1														
3″	207 / 3.0	105 / 3.1	71.0 / 3.1	54 / 3.2	43.8 / 3.2	37.0 / 3.3	32.1 / 3.3			NUMBERS ARE OMITED IN THIS SPACE								
4″	276 / 4.1	140 / 4.1	94.7 / 4.2	72 / 4.2	58.4 / 4.3	49.3 / 4.4	42.9 / 4.4	38.0 / 4.5	31.2 / 4.6	ON ACCOUNT OF THE WIDE ANGLE								
5″	345 / 5 1	175 / 5.1	118.3 / 5.2	90 / 5.3	73.0 / 5.4	61.7 / 5.4	53.6 / 5.5	47.5 / 5.6	39.0 / 5.7	33.3 / 5.9	OF LENS REQUIRED							
6″	414 / 6.1	210 / 6.2	142.0 / 6.3	108 / 6.4	87.6 / 6.4	74.0 / 6.5	64.3 / 6.6	57.0 / 6.7	46.8 / 6.9	40.0 / 7.1	31.5 / 7.4							
7″	483 / 7.1	245 / 7.2	165.7 / 7.3	126 / 7.4	102.2 / 7.5	86.3 / 7.6	75.0 / 7.7	66.5 / 7.8	54.6 / 8.0	46.7 / 8.2	36.7 / 8.6	30.8 / 9.1	(MORE THAN 90 DEGREES.)					
8″	552 / 8.1	280 / 8.2	189.3 / 8.4	144 / 8.5	116.8 / 8.6	98.7 / 8.7	85 7 / 8.8	76.0 / 8.9	62.4 / 9 2	53.3 / 9.4	42.0 / 9.9	35 2 / 10.4						
9″	621 / 9.1	315 / 9.3	213.0 / 9.4	162 / 9.5	131.4 / 9.7	111.0 / 9.8	96.4 / 9.9	85.5 / 10.1	70.2 / 10.3	60.0 / 10.6	47.2 / 11.1	39.6 / 11.6	30.9 / 12.7					
10″	690 / 10.1	350 / 10.3	236.7 / 10.4	180 / 10.6	146 0 / 10.7	123.3 / 10.9	107.1 / 11.0	95.0 / 11.2	78.0 / 11.5	66.7 / 11.8	52·5 / 12.4	44 0 / 12.9	34.3 / 14.1					
11″	759 / 11.2	385 / 11.3	260.3 / 11.5	198 / 11.6	160.6 / 11.8	135.7 / 12.0	117.9 / 12.1	104.5 / 12.3	85.8 / 12.6	73.3 / 12.9	57 7 / 13.6	48.4 / 14.2	37.7 / 15.5	31.8 / 16.8				
12″	828 / 12.2	420 / 12.4	284.0 / 12.5	216 / 12.7	175.2 / 12.9	148.0 / 13.1	128.6 / 13.2	114.0 / 13.4	93.6 / 13.8	80 0 / 14.1	63.0 / 14.8	52.8 / 15.5	41.1 / 16.9	34.7 / 18.4	30.6 / 19.8			
13″	897 / 13.2	455 / 13.4	307.7 / 13.6	234 / 13.8	189.8 / 14.0	160.3 / 14.1	139.3 / 14.3	123.5 / 14.5	101.4 / 14.9	86.7 / 15.3	68.2 / 16.1	57.2 / 16.8	44.6 / 18 4	37·6 / 19.9	33.1 / 21.4	30.0 / 22.9		
14″	966 / 14.2	490 / 14.4	331.3 / 14.6	252 / 14.8	204.4 / 15.0	172.7 / 15.2	150.0 / 15.4	133.0 / 15.6	109.2 / 16 1	93.3 / 16.5	73.5 / 17.3	61.6 / 18.0	48.0 / 19.8	40.4 / 21.4	35.6 / 23.1	32.3 / 24 7		
15″	1035 / 15.2	525 / 15.4	355.0 / 15.7	270 / 15 9	219.0 / 16.1	185.0 / 16.2	160.7 / 16.5	142.5 / 16.8	117.0 / 17.2	100 0 / 17.6	78.7 / 18.5	66.0 / 19 4	51.4 / 21.2	43.3 / 22.9	38.2 / 24.7	34.6 / 26.5	32.0 / 28.2	30.0 / 30.0
16″	1104 / 16.2	560 / 16.5	378.7 / 16.7	288 / 16.9	233.6 / 17.2	197.3 / 17.4	171.4 / 17.6	152.0 / 17.9	124.8 / 18.4	106.7 / 18.8	84.0 / 19.8	70.4 / 20.7	54.9 / 22.6	46 2 / 24.5	40.7 / 26.4	36.9 / 28.2	34.1 / 30.1	32.0 / 32.0
18″	1242 / 18.3	630 / 18.5	426.0 / 18.8	324 / 19 1	262.8 / 19 3	222.0 / 19.6	192.9 / 19.9	171.0 / 20.1	140.4 / 20.6	120.0 / 21.2	94.5 / 22.2	79.2 / 23.3	61.7 / 25.4	52.0 / 27.5	45.8 / 29.6	41.5 / 31.8	38.4 / 33.9	36.0 / 36.0
20″	1380 / 20.3	700 / 20,6	473.3 / 20 9	360 / 21.2	292.0 / 21.5	246.7 / 21.8	214.3 / 22.1	90.0 / 22.4	156.0 / 22.9	133.3 / 23.5	105.0 / 24.7	88.0 / 25.9	68.6 / 28.2	57.8 / 30.6	50.9 / 32.9	46.2 / 35.3	42.7 / 37.6	40.0 / 40.0
22″	1518 / 22.3	770 / 22.6	520.7 / 23.0	396 / 23.3	321.2 / 23 6	271.3 / 23.9	235.7 / 24.3	209.0 / 24.8	171.6 / 25.2	146.7 / 25 9	115.5 / 27.2	96.8 / 28.5	75.4 / 31.1	63.6 / 33.6	56.0 / 36.2	50.8 / 38.9	46.9 / 41.4	44.0 / 44.0
24″	1656 / 24.4	840 / 24.7	568.0 / 25.1	432 / 25.4	350.4 / 25.8	296.0 / 26.1	257.1 / 26·5	228.0 / 26.8	187.2 / 27.5	160.0 / 28.2	126.0 / 29.6	105.6 / 31.1	82.3 / 33.9	69.3 / 36.7	61.1 / 39.5	55.4 / 42.4	51.2 / 45.2	48.0 / 48.0
26″	1794 / 26.4	910 / 26 8	615.3 / 27.1	468 / 27.5	379 6 / 27.9	320.6 / 28.3	278.6 / 28.7	247.0 / 29.0	202.8 / 29.8	173.3 / 30.6	136.5 / 32.1	114.4 / 33.6	89.1 / 36 7	75 1 / 39.8	66.2 / 42.8	60.0 / 45.9	55.5 / 48.9	52.0 / 52.0
28″	1932 / 28.4	980 / 28.8	662.7 / 29.2	504 / 29.6	408 8 / 30.1	345.3 / 30.5	300.0 / 30.9	266.0 / 31.3	218.4 / 32.1	186.7 / 32.9	147.0 / 34.6	123.2 / 36.2	96.0 / 39.5	80 9 / 42.8	71.3 / 46.1	64.6 / 49.4	59.7 / 52.7	56.0 / 56.0
30″	2070 / 30.4	1050 / 30.9	710.0 / 31.3	540 / 31.8	438.0 / 32.2	370.0 / 32.6	321.4 / 33.1	285.0 / 33.5	234.0 / 34.4	200.0 / 35.3	157.5 / 37.1	132.0 / 38 8	102.9 / 42.4	86.7 / 45.9	76.4 / 49 4	69.2 / 52.9	64.0 / 56.5	60.0 / 60.0
34″	2346 / 34.5	1190 / 35.0	804.7 / 35 5	612 / 36 0	511.0 / 36.5	419 3 / 37.0	364.3 / 37.5	323.0 / 38.0	265.2 / 39.0	226.7 / 40.0	178.5 / 42.0	149.6 / 44.0	116 6 / 48.0	98.2 / 52.0	86 5 / 56.0	78.5 / 60.0	72.5 / 64.0	68.0 / 68.0
38″	2622 / 38.6	1330 / 39.1	899.3 / 39.7	684 / 40.2	584.0 / 40.8	468.6 / 41.4	407.1 / 41 9	361.0 / 42.5	296 4 / 43 6	253.3 / 44 7	199.5 / 46.9	167.2 / 49 8	130.3 / 53.6	109 8 / 58.1	96.7 / 62.6	87.7 / 67.1	81.1 / 71.5	76.0 / 76.0
42″	2898 / 42.6	1470 / 43.2	994.0 / 43.9	756 / 44.4	657 0 / 45.1	518.0 / 45.7	450.0 / 46.3	399.0 / 46.9	327.6 / 48.2	280.0 / 49.4	220.5 / 51.9	184.8 / 54.3	144.0 / 59.3	121.3 / 64.2	106 9 / 69.2	96.9 / 74.1	89.6 / 79.1	84.0 / 84.0

The table gives, in inches, the distances from lens to object (greater conjugate focus—upper number) nd from lens to ground glass (lesser conjugate focus—lower number) for different heights of images and ifferent lengths of foci of lenses when the height of the object is 68 inches (= AVERAGE HEIGHT OF MAN).

EXAMPLES: To find the height of image of a person which is 114 inches distant from lens, when a lens of 2 inches focal length is employed. -The heigth of image is in this case 8 inches.

To find the distances between object, lens and ground-glass, if the image of a person is to be 8 inches high nd a 12-inch focus lens is used.—The distance from object to lens will be 114 inches, and from lens to groundlass 13.4 inches.

TABLE SHOWING DISPLACEMENT ON GROUND GLASS OF OBJECTS IN MOTION.

By HENRY L. TOLMAN.

[Republished, with corrections, from the *Photographic Times*.]

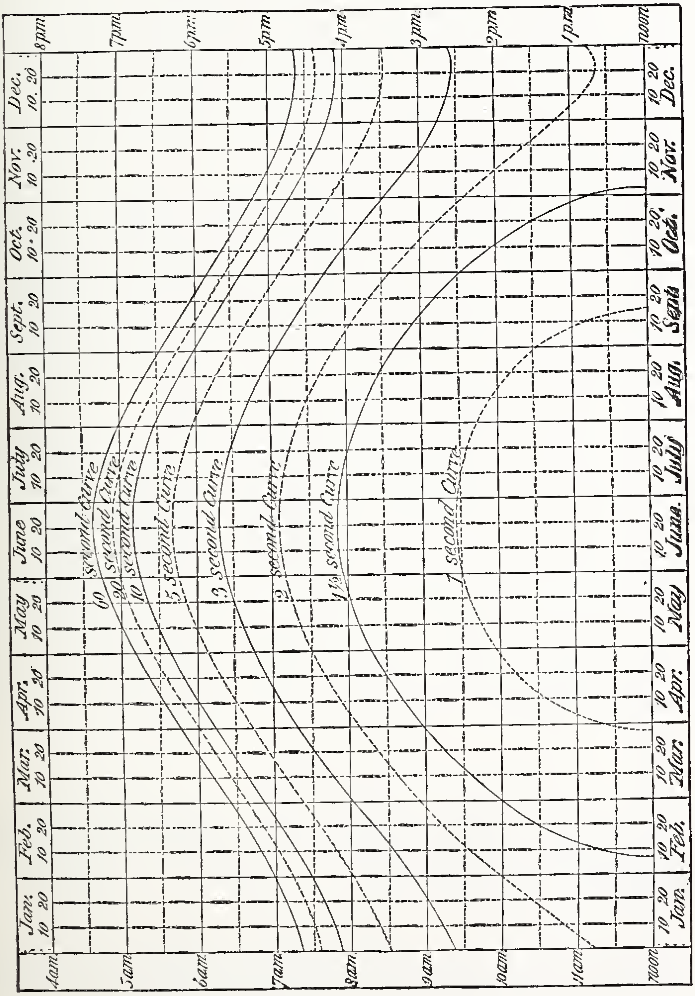
LENS 6 IN EQUIV. FOCUS, GROUND GLASS AT PRINCIPAL FOCUS OF LENS.

Miles per Hour.	Feet per Second.	Distance on Ground Glass, in inches, with Object 30 Feet away.	Same with Object 60 Feet away.	Same with Object 120 Feet away.
1	1½	.29	.15	.073
2	3	.59	.29	.147
3	4½	.88	.44	.220
4	6	1.17	.59	.293
5	7½	1.47	.73	.367
6	9	1.76	.88	.440
7	10½	2.05	1 03	.513
8	12	2 35	1.17	.587
9	13	2.64	1.32	.660
10	14½	2.93	1.47	.733
11	16	3.23	1.61	.807
12	17½	3.52	1.76	.880
13	19	3.81	1.91	.953
14	20½	4.11	2.05	1.027
15	22	4.40	2.20	1.100
20	29	5.87	2.93	1.467
25	37	7.33	3 67	1.833
30	44	8.80	4.40	2.200
35	51	10.27	5.13	2.567
40	59	11.73	5.97	2·933
45	66	13 20	6.60	3.300
50	73	14.67	7.33	3.667
55	80	16.13	8.06	4.033
60	88	17.60	8.80	4.400
75	110	22.00	11.00	5.500
100	147	29.33	14.67	7.333
125	183	36.67	18.33	9.167
150	220	44.00	22.00	11.000

DIAGRAM OF COMPARATIVE EXPOSURES.

Computed for the latitude of Washington, D. C. (38 deg., 54 min., N.)

By Lieut. Commander S. W. Very, U. S. N.



The straight lines in this diagram represent divisions of time; the vertical ones showing the month and day, and the horizontal ones the time of day as shown by a sun-dial.

The curved lines are curves of equal altitudes of the sun, computed for the latitude of Washington, for the year 1889.

The combination of the two systems of lines is designed to enable the photographer, whether amateur or professional, who has at some time determined the length of exposure required under certain circumstances of subject, clouds, lens, diaphragm, plate or film, etc., to decide what exposure to give *under the same circumstances*, at any time between sunrise and sunset, on any day of the year.

The diagram is based upon one constructed for the latitude of London, published in the *Photographic News*, in 1887, and reprinted in the ANNUAL of 1888, and the same standard of comparison is used in this adaptation—that is, such circumstances of subject, clouds, lens, diaphragm, plate or film, etc., as will require an exposure of one second, at noon of any day between the 4th of April and the 7th of September, or at any time between a quarter to ten in the forenoon and a quarter past two in the afternoon on the 21st of June.

The diagram, although constructed for the year 1889, and for the latitude of Washington, will serve equally well for any other year, and well enough for ordinary purposes, throughout the United States (exclusive of Alaska), although in the extreme Northern and Southern belts it will not be accurate.

The diagram is strictly accurate for "apparent time" only, but it is sufficiently so for "local mean time" (which may differ sixteen minutes from "apparent time"), and in the great majority of places for "standard time" (which in some places differs half an hour from "mean time," and may differ three-quarters of an hour from "apparent time").

EXAMPLES.

Q. With a certain lens, diaphragm, etc., it is found that on the 20th of July, at 9.30 A.M., a certain subject requires three seconds' exposure; what time should be given on the 10th of December, at 3.30 P.M., the subject, lens, etc., being the same?

A. Fifteen seconds.

Q. At noon of the 15th of May, a certain subject required ten seconds; what length of exposure should be given to the same subject, with the same lens, diaphragm, etc., on the 1st of November, at 8 A.M.?

A. Forty-five seconds.

TABLE OF COMPARATIVE LIGHT VALUES.

By Rev. Dwight W. Smith.

While there is a wider range in timing the exposure of a dry plate than is generally supposed, yet it is well known that there is but one correct interval for the best results with a normal developer. To best approximate that interval at all available hours of the day and year requires some attention and experience. There was a time when plates of a given brand and sensitiveness were quite unreliable, but now that they are so uniform, and improving more and more in this direction, tables of light values that were found to be comparatively useless will now be found of increasing value. The subjoined table, based upon the diagram in this book, by Lieutenant S. W. Very, U. S. N., has been computed for the first half of each month, and at a glance one may obtain information that would otherwise require time and trouble, and that even skill and experience does not always provide for, especially during the time indicated in which there is a rapid loss of light. It will be seen that in January, the light value for noon is given as 1.7, while at 4 P.M. the exposure would necessarily be more than five times that duration. For July, the most rapid as well as longest available light of any month, the light at noon is indicated by .2 instead of 1.7, and at 3 P.M. more than twice the time will be required.

The first column indicates the hour of the day; the second column the comparative light values in whole numbers and tenths.

JANUARY.		FEBRUARY.		MARCH.		APRIL.	
8	10	8	6	8	3	8	2
9	4	9	4	9	2	9	1.5
10	2.5	10	2	10	1.5	10	1.7
11	2	11	1.7	11	1.2	11	1
12	1.7	12	1.5	12	1	12	1
1	1.7	1	2	1	1	1	1
2	2.5	2	2.7	2	1.7	2	1.2
3	4.5	3	3.5	3	2	3	1.5
4	9	4	5	4	4	4	2
		5	60	5	20	5	4
						6	20

MAY.		JUNE.		JULY.		AUGUST.	
8	1.7	8	1.7	8	1.5	8	1.7
9	1.2	9	1.2	9	1.2	9	1.5
10	1	10	1	10	1	10	1
11	.7	11	.6	11	.5	11	.7
12	.5	12	.3	12	.2	12	.5
1	.7	1	.5	1	.5	1	.5
2	1	2	.7	2	1	2	1
3	1.2	3	1.2	3	1.2	3	1.2
4	1.5	4	1.5	4	1.5	4	1.7
5	2.7	5	2.2	5	2.2	5	2.5
6	15	6	5	6	4	6	5
7	80	7	20	7	15	7	60

SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
8	2	8	3	8	4	8	9
9	1.5	9	1.7	9	3	9	3
10	1	10	1.5	10	2	10	2
11	1	11	1.2	11	1.7	11	1.5
12	.5	12	1	12	1.5	12	1.7
1	1	1	1.2	1	1.5	1	2
2	1.2	2	1.5	2	2	2	2.5
3	1.5	3	2	3	2.5	3	3.5
4	2	4	2.7	4	5	4	8
5	3	5	6	5	20	5	80
6	10	6	40	6	70		

PROF. BURTON'S TABLE OF COMPARATIVE EXPOSURES.

Apertures Calculated on the Standard System of the Photographic Society.	Sea and Sky.	Open Land-scape.	Landscape with heavy foliage in foreground.	Under Trees, up to		Fairly Lighted Interiors.		Badly Lighted Interiors, up to		Portraits in bright diffused Light out of doors.	Portraits in good Studio Light.		Portraits in Ordinary Room.	
				mins.	secs.	mins.	secs.	hrs.	mins.		mins.	secs.	mins.	secs.
No. 1, or $\frac{f}{4}$	$\frac{1}{160}$ sec.	$\frac{1}{50}$ sec.	$\frac{1}{8}$ sec.	0	10	0	10	0	2	$\frac{1}{6}$ sec.	0	1	0	4
No. 2, or $\frac{f}{5.657}$	$\frac{1}{80}$ sec.	$\frac{1}{25}$ sec.	$\frac{1}{4}$ sec.	0	20	0	20	0	4	$\frac{1}{3}$ sec.	0	2	0	8
No. 4, or $\frac{f}{8}$	$\frac{1}{40}$ sec.	$\frac{1}{12}$ sec.	$\frac{1}{2}$ sec.	0	40	0	40	0	8	$\frac{2}{3}$ sec.	0	4	0	16
No. 8, or $\frac{f}{11.314}$	$\frac{1}{20}$ sec.	$\frac{1}{6}$ sec.	1 sec.	1	20	1	20	0	16	$1\frac{1}{3}$ sec.	0	8	0	32
No. 16, or $\frac{f}{16}$	$\frac{1}{10}$ sec.	$\frac{1}{3}$ sec.	2 secs.	2	40	2	40	0	32	$2\frac{2}{3}$ secs.	0	16	1	4
No. 32, or $\frac{f}{22.627}$	$\frac{1}{5}$ sec.	$\frac{2}{3}$ sec.	4 secs.	5	20	5	20	1	4	$5\frac{1}{3}$ secs.	0	32	2	8
No. 64, or $\frac{f}{32}$	$\frac{2}{5}$ sec.	$1\frac{1}{3}$ sec.	8 secs.	10	40	10	40	2	8	$10\frac{2}{3}$ secs.	1	4	4	16
No. 128, or $\frac{f}{45.255}$	$\frac{4}{5}$ sec.	$2\frac{2}{3}$ secs.	16 secs.	21	20	21	20	4	16	21 secs.	2	8	8	32
No. 256, or $\frac{f}{64}$	$1\frac{3}{5}$ sec.	$5\frac{1}{3}$ secs.	32 secs.	42	40	42	40	8	32	42 secs.	4	16	17	4

LANTERNISTS' READY REFERENCE TABLE.

(From Optical Magic Lantern Journal.)

If A=focal length of objective, B=diameter of slide, C=diameter of disc on screen, D=distance between objective and screen, then $D=\frac{C \times A}{B}$ $A=\frac{D \times B}{C}$ $C=\frac{D \times B}{A}$

The following table has been computed by these rules and will show by a glance the relations between the size of disc and distance from screen for object glasses of all foci from 4 inches to 15 inches. The diameter of slide is taken as 3 inches, that being the usual opening of the mat.

Distance between Lantern and Screen.	FOCUS OF LENS. 4in.	5in.	6in.	7in.	8in.	9in.	10in.	11in.	12in.	13in.	14in.	15in.
	DIAMETER OF DISC.											
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
10 feet.	7 6	6 0	5 0	4 3	3 9	3 4	3 0	2 9	2 6	2 4	2 2	2 0
11 "	8 3	6 7	5 6	4 9	4 2	3 8	3 4	3 0	2 9	2 6	2 4	2 2
12 "	9 0	7 2	6 0	5 2	4 6	4 0	3 7	3 3	3 0	2 9	2 7	2 5
13 "	9 9	7 10	6 6	5 7	4 11	4 4	3 11	3 7	3 3	3 0	2 9	2 7
14 "	10 6	8 5	7 0	6 0	5 3	4 8	4 2	3 10	3 7	3 3	3 0	2 9
15 "	11 3	9 0	7 6	6 5	5 8	5 0	4 6	4 1	3 9	3 6	3 3	3 0
20 "	15 0	12 0	10 0	8 7	7 6	6 8	6 0	5 6	5 0	4 7	4 3	4 0
25 "	18 9	15 0	12 6	10 9	9 4	8 4	7 6	6 10	6 3	5 0	5 4	5 0
30 "	22 6	18 0	15 0	12 10	11 3	10 0	9 0	8 2	7 6	6 11	6 5	6 0
35 "	26 3	21 0	17 6	15 0	13 1	11 8	10 6	9 6	8 9	8 1	7 6	7 0
40 "	30 0	24 0	20 0	17 2	15 0	13 4	12 0	10 10	10 0	9 2	8 6	8 0
45 "	33 9	27 0	22 6	19 3	16 10	15 0	13 6	12 3	11 3	10 4	9 8	9 0
50 "	37 6	30 0	25 0	21 5	18 9	16 8	15 0	13 8	12 6	11 6	10 9	10 0

EXAMPLES.—An 8in. focus lens at a distance of 35ft. will give a disc of 13ft. 1in. To produce a disc of 12ft. with a lens of 10in. focus, the lantern and screen must be separated by 40ft. To produce a disc of 15ft. at a distance of 45ft. will require a lens of 9in. focus.

TABLE FOR ENLARGEMENT AND REDUCTION.

COMPUTED FOR CENTIMETERS OR INCHES.

Equivalent Focus of the Lens.	DISTANCES OF THE OBJECT AND THE GROUND GLASS SCREEN FROM THE CENTER OF THE OBJECTIVE.																								
	1 *t.*	2 *t.*	3 *t.*	4 *t.*	5 *t.*	6 *t.*	7 *t.*	8 *t.*	9 *t.*	10 *t.*	11 *t.*	12 *t.*	13 *t.*	14 *t.*	15 *t.*	16 *t.*	17 *t.*	18 *t.*	19 *t.*	20 *t.*	21 *t.*	22 *t.*	23 *t.*	24 *t.*	25 *t.*
5..	10 10	15 7.5	20 6.7	25 6.2	30 6	35 5.8	40 5.7	45 5.6	50 5.6	55 5.5	60 5.5	65 5.4	70 5.4	75 5.4	80 5.3	85 5.3	90 5.3	95 5.3	100 5.3	105 5.3	110 5.2	115 5.2	120 5.2	125 5.2	130 5.2
6..	12 12	18 9	24 8	30 7.5	36 7.2	42 7	48 6.9	54 6.8	60 6.7	66 6.6	72 6.5	78 6.5	84 6.5	90 6.4	96 6.4	102 6.4	108 6.4	114 6.3	120 6.3	126 6.3	132 6.3	138 6.3	144 6.3	150 6.3	156 6.2
7..	14 14	21 10.5	28 9.3	35 8.8	42 8.4	49 8.2	56 8	63 7.9	70 7.8	77 7.7	84 7.6	91 7.6	98 7.5	105 7.5	112 7.5	119 7.4	126 7.4	133 7.4	140 7.4	147 7.4	154 7.3	161 7.3	168 7.3	175 7.3	182 7.3
8..	16 16	24 12	32 10.7	40 10	48 9.6	56 9.3	64 9.1	72 9	80 8.8	88 8.8	96 8.7	104 8.7	112 8.6	120 8.6	128 8.5	136 8.5	144 8.5	152 8.4	160 8.4	168 8.4	176 8.4	184 8.4	192 8.3	200 8.3	208 8.3
9..	18 18	27 13.5	36 12	45 11.3	54 10.8	63 10.5	72 10.3	81 10.1	90 10	99 9.9	108 9.8	117 9.8	126 9.7	135 9.6	144 9.6	153 9.6	162 9 5	171 9.5	180 9.5	189 9.5	198 9.4	207 9.4	216 9.4	225 9.4	234 9.4
10..	20 20	30 15	40 13.3	50 12.5	60 12	70 11.7	80 11.4	90 11.3	100 11.1	110 11	120 10.9	130 10.8	140 10.8	150 10.7	160 10.7	170 10.6	180 10.6	190 10.6	200 10.5	210 10.5	220 10.5	230 10.5	240 10.4	250 10.4	260 10.4
11..	22 22	33 16.5	44 14.7	55 13.8	66 13.2	77 12.8	88 12.6	99 12.4	110 12.2	121 12.1	132 12	143 11.9	154 11.8	165 11.8	176 11.7	187 11.7	198 11.6	209 11.6	220 11.6	231 11.6	242 11.5	253 11.5	264 11.5	275 11.5	286 11.4
12..	24 24	36 18	43 16	60 15	72 14.4	84 14	96 13.7	108 13.5	120 13.3	132 13.2	144 13.1	156 13	168 12.9	180 12.9	192 12.8	204 12.7	216 12.7	228 12.7	240 12.6	252 12.6	264 12.6	276 12.5	288 12.5	300 12.5	312 12.5
13..	26 26	39 19.5	52 17.3	65 16.3	78 15.6	91 15.2	104 14.9	117 14.6	130 14·4	143 14.3	156 14.2	169 14.1	182 14	195 13.9	208 13.9	221 13.8	234 13.8	247 13.7	260 13.7	273 13.7	286 13.6	299 13.6	312 13.6	325 13.5	338 13.5
14..	28 28	42 21	56 18.7	70 17.5	84 16.8	98 16.3	112 16	126 15.8	140 15.6	154 15.4	168 15.3	182 15.2	196 15.1	210 15	224 14.9	238 14.9	252 14.8	266 14.8	280 14.7	294 14.7	308 14.7	322 14.6	336 14.6	350 14.6	364 14.6
15..	30 30	45 22.5	60 20	75 18.8	90 18	105 17.5	120 17.1	135 16.9	150 16.7	165 16.5	180 16.4	195 16.3	210 16.2	225 16.1	240 16	255 15.9	270 15.9	285 15.8	300 15.8	315 15.8	330 15.7	345 15.7	360 15.7	375 15.6	390 15.6

16..	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	400	416
	33	24	21.3	20	19.2	18.7	18.8	18	17.8	17.6	17.5	17.3	17.2	17.1	17.1	17	16.9	16.9	16.8	16.8	16.8	16.7	16.7	16.7	16.6
17..	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391	408	425	442
	34	25.5	22.7	21.3	20.4	19.8	19.4	19.1	18.9	18.7	18.5	18.4	18.3	18.2	18.1	18.1	18	17.9	17.9	17.9	17.8	17.8	17.7	17.7	17.7
18..	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360	378	396	414	432	450	468
	36	27	24	22.5	21.6	21	20.6	20.3	20	19.8	19.6	19.5	19.4	19.3	19.2	19.1	19.1	19	18.9	18.9	18.9	18.8	18.8	18.8	18.7
19..	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380	399	418	437	456	475	494
	38	28.5	25.3	23.8	22.8	22.2	21.7	21.4	21.1	20.9	20.7	20.6	20.5	20.4	20.3	20.2	20.1	20.1	20	20	19.9	19.9	19.8	19.8	19.8
20..	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520
	40	30	26.7	25	24	23.3	22.9	22.5	22.2	22	21.8	21.7	21.5	21.4	21.3	21.3	21.2	21.1	21.1	21	21	20.9	20.9	20.8	20.8
21..	42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420	441	462	483	504	525	546
	42	31.5	28	26.3	25.2	24.5	24	23.6	23.3	23.1	22.9	22.8	22.6	22.5	22.4	22.3	22.2	22.2	22.1	22.1	22	22	21.9	21.9	21.8
22..	44	66	88	110	132	154	176	198	220	242	264	286	308	330	352	374	396	418	440	462	484	506	528	550	572
	44	33	29.3	27.5	26.4	25.7	25.1	24.8	24.4	24.2	24	23.8	23.7	23.6	23.5	23.4	23.3	23.2	23.2	23.1	23	23	23	22.9	22.9
23..	46	69	92	115	138	161	184	207	230	253	276	299	322	345	368	391	414	437	460	483	506	529	552	575	598
	46	34.5	30.7	28.8	27.6	26.8	26.3	25.9	25.6	25.3	25.1	24.9	24.8	24.6	24.5	24.4	24 4	24.3	24.2	24.2	24.1	24	24	24	23.9
24..	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600	624
	48	36	32	30	28.8	28	27.4	27	26.7	26.4	26.2	26	25.8	25.7	25.6	25.5	25.4	25.3	25.3	25.2	25.1	25.1	25	25	25
25..	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650
	50	37.5	33.3	31.3	30	29.2	28.6	28.1	27.8	27.5	27.3	27.1	26.9	26.8	26.7	26.6	26.5	26.4	26.3	26.3	26.2	26.1	26.1	26	26

The use of the above table will best be explained by illustrations:

To enlarge six times with a lens of 15 centimeters (or inches) focal length. We find in the table under 6 *t.* and opposite 15, the figures $\frac{105}{17.5}$, hence the object must be 17.5, and the screen 105 centimeters (or inches) from the centre of the lens.

To reduce eight times with a lens of 19 centimeters (or inches) focus, the object must be 171 and the screen 21.4 centimeters (or inches) from centre of lens.

The table can be formulated thus: Where p = focal length of lens, a = distance from ground-glass to centre of lens and b = distance from object to centre of lens, then $\frac{1}{a} + \frac{1}{b} = \frac{1}{p}$

USUAL SIZES OF FRENCH, GERMAN AND ITALIAN DRY PLATES.

French and German.	Inches.
6½x 9 Centimetres	2.5x 3.6
9 x12 "	3.6x 4.7
12 x15 "	4.7x 5.9
13 x18 "	5.1x 7.0
12 x20 "	4.7x 7.8
15 x21 "	5.9x 8.2
15 x22 "	5.9x 8.6
18 x24 "	7.2x 9.4
21 x27 "	8.2x10.6
24 x30 "	9.4x11 8
27 x33 "	10.6x12.9
27 x35 "	10.6x13.7
30 x40 "	11.8x15.7
40 x50 "	15.7x19.6
50 x60 "	19.6x23.6

Italian.	Inches.
9x12 Centimetres	3.6x 4.7
12x16 "	4.7x 6.3
12x18 "	4.7x 7.2
13x18 "	5.1x 7.0
12x20 "	4.7x 7.8
18x24 "	7.0x 9.4
21x27 "	8.2x10 6
24x30 "	9.4x11.8
27x33 "	10.6x12.9
30x36 "	11.8x14.1
40x50 "	15.7x19.6
50x60 "	19.6x23.6

SIZES OF GLASS, MOUNTS, PAPER, ETC.

Petite cards	1⅝x3⅛
One-ninth plate	2 x2½
One-sixth plate	2¾x3¼
One-fourth plate	3¼x4¼
Half plate 4¼x5½ and	4¼x6½
Half plate (English)	4¾x6½
Whole plate (4–4)	6½x8½
Extra 4–4	8 x10

Other sizes are expressed by inches.

Sizes of Mounts.

Stereoscopic	3½x7, 4x7, 4¼x7, 4½x7, 5x8		
Victoria	3¼x5	Minette	1½x2⅜
Imperial	7⅞x9⅞	Card	2½x4⅛
Boudoir	5¼x8½	Cabinet	4¼x6½
Panel	4 x8¼	Promenade	4⅛x7⅛

Sizes of Albumen Paper.

18x22¾, 20½x24½, 22x36, 26x40, 27x42.

Size of blotting paper 19x24

FREEZING MIXTURES.

Parts. Reducing the Temperature	From Degrees of the Celsius	To Thermometer.
3 Nitrate of sodium + 4 Water	+13.2 deg.	— 5.3 deg.
9 Phosphate of sodium + 4 dilute Nitric acid	+10 "	— 9 "
3 Sulphate of sodium + 2 dilute Nitric acid	+10 "	—10 "
1 Nitrate of sodium + 4 Water	....	—10.6 "
1 Chloride of potassium + 4 Water	....	—11.8 "
5 Sal ammoniac + 5 Saltpetre + 16 Water	+10 deg.	—12 "
1 Nitrate of ammonia + 1 Water	+10 "	—15.5 "
8 Sulphate of sodium + 5 conc. Sulphuric acid.	+10 "	—17 "
1 Sulphocyanate of Potass. + 1 Water	+18 "	—21 "
1 Chloride of sodium + 3 Snow	....	—21 "
1 Sal ammoniac + 1 Saltpetre + 1 Water	+ 8 deg.	—24 "
3 Crystal. chloride of calcium + 1 Snow	....	—36
1 Snow + 1 dilute Sulphuric acid	— 5 deg.	—41

LIST OF THE PRINCIPAL CHEMICALS USED IN PHOTOGRAPHY, WITH ENGLISH, LATIN, GERMAN AND FRENCH NAMES.

COMPILED BY C. L. LOCHMAN.

ENGLISH.	LATIN.	GERMAN.	FRENCH.
Acid, Acetic	Acidum aceticum	Essigsäure	Acide acetique.
" " Glacial	Acidum aceticum glaciale.	Eisessig	Vinaigre glacial.
" Boric· Boracic	Acidum boricum	Borsäure	Acide borique.
" Chromic	Acidum chromicum	Chromsäure	Acide chromique.
" Citric	Acidum citricum	Citronensäure	Acide citrique.
" Gallic	Acidum gallicum	Gallussäure	Acide gallique.
" Hydrochloric *Muriatic.*	Acidum hydrochloricum.	Salzsäure	Acide chlorhydrique.
" Hydrofluoric	Acidum hydrofluoricum.	Fluss-säure	Acide fluorhydrique.
" Nitric	Acidum nitricum	Salpetersäure	Acide nitrique (azotique.
" Oxalic	Acidum oxalicum	Oxalsäure	Acide oxalique.
" Pyrogallic; Pyrogallol	Acidum pyrogallicum.	Pyrogallussäure; Pyrogallol.	Acide pyrogallique.
" Tartaric	Acidum tartaricum	Weinsteinsäure	Acide tartarique.
" Sulphuric	Acidum sulphuricum.	Schwefelsäure	Acide sulfurique.
" Tannic; Tannin	Acidum tannicum	Gerbsäure	Acide tannique.
Alcohol, Ethyl	Alcohol	Weingeist	Alcool.
Alcohol, Wood	Alcohol methylicum.	Holzgeist	Alcool methylique.
Alum, Ammonia	Aluminii et ammonii sulphas.	Ammoniak Alaun	Sulphate d' alumine et d'ammoniaque.
Alum, Chrome	Chromii et potassii sulphas.	Chrom-Alaun	Alun chromi-potassique.
Alum, Potassa	Aluminii et potassii sulphas.	Kali-Alaun	Sulfate d'alumine et de potasse.
Amidol (*Diamidophenol Chlorhydrate.*)	Amidolum	Amidol	Amidol.
Ammonium Bichromate	Ammonii bichromicum	Doppeltchromsaures Ammon.	Bichromate d'ammoniaque.
" Bromide	Ammonii bromidum	Ammoniumbromid	Bromure d'ammonium.
" Carbonate	Ammonii carbonas	Ammoniumcarbonat	Carbonate d'ammoniaque.
" Chloride	Ammonii chloridum	Ammoniumchlorid	Chlorure d'ammonium
" Citrate	Ammonii citras	Ammoniumcitrat	Citrate d'ammoniaque.
" Iodide	Ammonii iodidum	Ammoniumiodid	Iodure d'ammonium.
" Nitrate	Ammonii nitras	Ammoniumnitrat	Azotate d'ammoniaque
" Salicylate	Ammonii salicylas	Ammoniumsalicylat	Salicylate d'ammoniaque.
" Succinate	Ammonii succinas	Ammoniumsuccinat	Succinate d'ammoniaque.
" Sulphocyanate	Ammonii sulphocyanas	Ammoniumsulfocyanat.	Sulfcyanate d'ammoniaque.
" Sulphydrate " *Sulphide Solution.*	Liquor ammonii hydrosulphas.	Schwefelammonium-lösung; Ammoniumsulfhydrat.	Sulfhydrate d'ammoniaque.
Barium Bromide	Barii bromidum	Baryumbromid	Bromure de baryum.
" Chloride	Barii chloridum	Baryumchlorid	Chlorure de baryum.
" Iodide	Barii iodidum	Baryumiodid	Iodure de baryum.
" Nitrate	Barii nitras	Baryumnitrat	Nitrate de baryte
Benzin	Benzinum.	Petroleumbenzin	Benzine.
Benzol	Benzolum.	Benzol	Benzole.
Bromine	Bromum; Brominium.	Brom	Brome.
Cadmium (metal)	Cadmium	Cadmium; Kadmium.	Cadmium.
" Bromide	Cadmii bromidum	Kadmiumbromid; Bromkadmium.	Bromure de cadmium.
" Chloride	Cadmii chloridum	Cadmiumchlorid	Chlorure de cadmium.
" Iodide	Cadmii iodidum	Kadmiumjodid; Jodkadmium.	Iodure de cadmium.
" Nitrate	Cadmii nitras	Cadmiumnitrat	Nitrate de cadmium.
Calcium Bromide	Calcii bromidum	Bromcalcium	Bromure de calcium.
" Carbonate	Calcii carbonas	Calciumcarbonat	Carbonate de chaux.
" Iodide	Calcii iodidum	Jodcalcium	Iodure de calcium.
Chloroform	Chloroformum	Chloroform	Chloroforme.

LIST OF THE PRINCIPAL CHEMICALS, ETC.—*Continued.*

ENGLISH.	LATIN.	GERMAN.	FRENCH.
Collodion	Collodium	Collodion	Collodion.
Cobalt Chloride	Cobalti chloridum	Cobaltchlorid	Chlorure de cobalt.
Copper, metal	Cuprum	Kupfer	Cuivre.
" Bromide	Cupri bromidum	Kupferbromid	Bromure de cuivre.
" Chloride	Cupri chloridum	Kupferchlorid	Chlorure de cuivre
" Nitrate	Cupri nitras	Kupfernitrat	Nitrate de cuivre.
" Sulphate	Cupri sulphas	Kupfersulfat	Sulfate de cuivre.
Dextrin	Dextrinum	Stärkegummi	Dextrine.
Eikonogen	Eikonogenum	Eikonogen	Eikonogen.
Ether (Sulphuric)	Aether (sulphuricus)	Aether; Schwefeläther	Ether sulfurique.
Gelatin	Gelatina	Gelatin	Gelatine.
Glycerin	Glycerinum	Glycerin	Glycerine.
Glycin	Glycinum	Glycin	Glycine.
Gold	Aurum	Gold	Or.
" Terchloride,	Auri chloridum	Goldchlorid	Chlorure d'or.
" and Sodium Chloride.	Auri et sodii chloridum	Natriumgoldchlorid	Chlorure d'or et de Sodium.
Gum Arabic	Gummi Arabicum	Arabisches Gummi	Gomme Arabique.
Gum Sandarac	Sandarac	Sandarak	Sandaraque.
Gum Shellac	Ressina lacca	Lack Gummilack	Laque.
Hydrochinon; Hydroquinon.	Hydrochinonum	Hydrochinon	Hydrochinon.
Iodine	Iodum: Iodidium	Jod	Iode.
Iron (Metal)	Ferrum	Eisen	Fer.
" Ammonio-Sulphate. (*Ammonio-Ferric Sulphate.*)	Ferri et ammonii sulphas.	Ferro-ammonium sulphat. *Schwefelsaure Eisenoxydul-ammoniak.*	Sulfate d'ammoniaque et de fer.
" Chloride (Ferrous) (*Ferro Chloride*).	Ferro chloridum	Eisenchlorür (*Ferrochlorid*).	Chlorure de fer. (*Chlorure ferreux*).
" Chloride (Ferric). (*Ferric Chloride*).	Ferri chloridum (*Ferri-sesquichloridum*).	Eisenchlorid (*Ferrichlorid*).	Perchlorure de fer.
" Iodide	Ferri iodidum	Eiseniodid (Jodeisen; Ferroiodid)	Iodure de fer.
" Oxalate (Ferrous)	Ferro-oxalas	Eisenoxalat	Oxalate de fer.
" Sulphate	Ferri sulphas	Ferrosulfat	Sulfate de fer.
Lead (Metal)	Plumbum	Blei	Plomb.
" Acetate	Plnmbi acetas	Bleiacetat	Acetate de plomb.
" Chloride	Plumbi chloridum	Bleichlorid	Chlorure de plomb.
" Nitrate	Plumbi nitras	Bieinitrat	Nitrate de plomb.
Lithium Bromide	Lithii bromidum	Bromlithium	Bromure de lithium.
" Iodide	Lithii iodidum	Jodlithium	Iodure de lithium.
Magnesium Bromide	Magnesii bromidum	Brommagnesium	Bromuredemagnesium
" Iodide	Magnesii iodidum	Jodmagnesium	Iodure de magnesium.
" Sulphate	Magnesii sulphas	Magnesiumsulfat	Sulfate de magnesie.
Mercury Bichloride	Hydrargyri bichloridum.	Aetzendes Quecksilber chlorid.	Deutochlorure de mercure.
Metol (*Monomethyl-paramido-meta-cresolate.*)	Metolum	Metol	Metole.
Oil of Lavender	Oleum Lavandulæ	Lavendelöl	Essence de Lavand.
Oil of Turpentine	Oleum Terebinthinæ	Terpintinöl	Essence Terebinthine.
Para-amidophenol Hydrochlorate.	Para-amidolphenol-hydrochloras.	Paramidophenol-hydrochlorat.	Para-amidophenol-hydrochlorate.
Platinum Chloride	Platini chloridum	Platinchlorid	Perchlorure de platine.
Plaltino Potassium Chloride.	Platini et Potassii chloridum.	Kali-Platinumchlorid	Chlorure de platinum et de potassium.
Potassa, Sulphnrated; Lilver of Sulphur.	Potassa sulphurata	Schwefelleber	Sulfure de potasse.
Potassium Acetate	Potassii acetas	Kaliumacetate	Acetate de potasse.
" Bichromate	Potassii bichromas	Kaliumbichromat	Bichromate de potasse.
" Bromide	Potassii bromidum	Kaliumbromid	Bromure de potassium.
" Carbonate	Potassii carbonas	Kaliumcarbonat	Carbonate de potasse.
" Citrate	Potassii citras	Kaliumcitrat	Citrate de potasse.
" Chloride	Potassii chloridum	Kaliumchlorid	Chlorure de potassium.
" Cyanide	Potassii cyanidum	Cyankalium	Cyanure de potassium.
" Ferricyanide	Potassii ferrieyanidum	Ferridcyankalium	Ferricyanure de potassium.
" Ferrocyanide	Potassii ferrocyanidum	Ferrocyanklium	Ferrocyanure de potassium.
" Hydrate; Potassa.	Potassii hydras; Potassa.	Aetzkali	Potasse caustique.

LIST OF THE PRINCIPAL CHEMICALS, Etc.—*Continued.*

ENGLISH.	LATIN.	GERMAN.	FRENCH.
Potassium Iodide	Potassii iodidum	Jodkalium	Iodure de potassium.
" Metabisulphite	Potassii metabisulphis	Kalium-metabisufis	Metabisulfis de potassium.
" Nitrate	Potassii nitras	Kaliumnitrat	Nitrate de potasse.
" Oxalate, neutral	Potassii oxalas	Kalium Oxalat, neutrales.	Oxalate de potasse.
" Permanganate	Potassii permanganas	Kaliumpermanganate	Permanganate de potasse.
" Sulphite	Potassii sulphis	Kaliumsulfit	Sulfite de potassium.
" Sulphocyanide	Potassii sulphocyanidum.	Kalium sulfocyanat; Rhodankalium.	Sulfocyanure de potassium.
Pyroxylin; Gun Cotton.	Pyroxylinum	Collodionwolle; Schiess-baumwolle.	Pyroxyle; Fulmi-coton
Reducin	Reducinum	Reducin	Reducine.
Rodinal	Rodinalum	Rodinal.	Rodinale.
Silver	Argentum	Silber.	Argent.
" Acetate	Argenti acetas	Silberacetat	Acetate d'argent.
" Citrate	Argenti citras	Silbercitrate	Citrate d'argent.
" Chloride	Argenti chloridum	Silberchlorid	Chlorure d'argent.
" Iodide	Argenti iodidum	Silberiodid	Iodure d'argent.
" Nitrate	Argenti nitras	Silbernitrat	Nitrate d'argent.
" Oxide	Argenti oxidum	Silbor Oxyd	Oxyde d'argent.
" Sulphate	Argenti sulphas	Silbersulfat	Sulfate d'argent.
Sodium Acetate	Sodii acetas	Natriumacetate	Acetate de soude.
" Biborate; Borax	Sodii biboras	Natriumborat; Borax	Borate de soude.
" Bicarbonate	Sodii bicarbonas	Natriumbicarbonat	Bicarbonate de soude.
" Bromide	Sodii bromidum	Bromnatrium	Bromure de sodium.
" Carbonate	Sodii carbonas	Natriumcarbonat	Carbonate de soude.
" Chloride	Sodii chloridum	Chlornatrium	Chlorure de sodium.
" Citrate	Sodii citras	Natriumcitrat; Citronensaures Natron.	Citrate de soude.
" Hydrate; Soda	Sodii hydras; Soda	Aeznatron	Soude caustique.
" Hyposulphite or Thiosulphate.	Sodii hyposulphis	Unterschwefligsaures Natron.	Hyposulfite de soude.
" Iodide	Sodii iodidum	Jodnatrium	Iodure de sodium.
" Sulphate	Sodii sulphas	Natriumsulfat	Sulfate de soude.
" Sulphite	Sodii sulphis	Natrium sulfit	Sulfite de soude.
" Tungstate	Sodii tungstas	Wolfraumsaures Natron.	Tungstate de soude.
Starch	Amylum	Stärke; Stârkmehl	Amidon.
Strontium Bromide	Strontii bromidum	Bromstrontium	Bromure de strontium.
" Chloride	Strontii chlordum	Chlorstrontium	Chlorure de strontium.
" Iodide	Strontii iodidum	Jodstrontium	Iodure de strontium.
Tannin, see Tannic Acid.			
Turpentine, Crude or White.	Terebinthina communis.	Geweiner Terpentin	Terebenthine commune.
Uranium Bromide	Uranii bromidum	Bromuranium	Bromure d'uranium.
Uranium Nitrate	Uranii nitras	Salpetersaures Uranoxyd.	Nitrate d'urane.
Water, Distilled	Aqua destillata	Destillirtes Wasser	Eau distillée.
Water of Ammonia	Aqua ammoniæ	Salmiakgeist; Ammoniak-Flussigkeit.	Eau d'ammoniaque.
Zinc Bromide	Zinci bromidum	Zinkbromid; Bromzink.	Bromure de zinc.
Zinc Chloride	Zinci chloridum	Chlorzink	Chlorure de zinc.
Zinc Iodide	Zinci iodidum	Zinkjodid; Jodzink	Iodure de zinc.

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UNITED STATES PATENTS.

Suits for redress on account of infringement of patents are brought in the United States Circuit Court for the District where the defendant resides. Redress may be had through an injunction preventing further infringement and an accounting of the damages caused the patentee, or the profits, gains, or advantages made by the infringer.

Until recently appeals from decisions rendered by the United States Circuit Court were necessarily taken to the Supreme Court of the United States, and, owing to the great amount of business done by the latter, a delay of at least four years was suffered by an appellee.

A new special Court, designated the Circuit Court of Appeals has been provided. Appeals may hereafter be taken to this Court, and are likely to be reached and disposed of quite expeditiously. This is of particular advantage to patentees, in view of the fact that their monopolies run but a limited time.

Patents are issued in the name of the United States and under the seal of the Patent Office to any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned; and by any person who, by his own industry, genius, efforts, and expense, has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo, or bas-relief; any new and original design for the printing of woolen, silk, cotton, or other fabrics, any new and original impression, ornament, pattern, print, or picture to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture; or any new, useful, and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, nor patented, nor described in any printed publication, upon payment of the fees required by law, and other due proceedings had.

Joint inventors are entitled to a joint patent; neither can claim one separately. Independent inventors of distinct and independent improvements in the same machine can not obtain a joint patent for their separate inventions; nor does the fact that one furnishes the capital and another makes the invention entitle them to make application as joint inventors; but upon the execution and recording of a proper assignment by the true inventor, the patent will be issued in the joint names of the parties.

Every patent contains a grant to the patentee, his heirs or assigns, for the term of seventeen years, of the exclusive right to make, use, and vend the invention or discovery throughout the United States and Territories, referring to the specification for the particulars thereof.

If it appear that the inventor, at the time of making his application, believed himself to be the first inventor or discoverer, a patent will not be refused, nor shall any patent be declared invalid on account of the invention or discovery, or any part thereof, having been known or used in any foreign country before his invention or discovery thereof, unless the application for said foreign patent was filed more than seven months prior to the filing of the application in this country, in which case no patent will be granted in this country.

Letters Patent granted under a foreign government will not, while in force, prevent the inventor from obtaining a patent in the United States, unless the invention shall have been introduced into public use into the United States more than two years prior to the filing of said application. But every patent granted for an invention which is the subject of Letters Patent still in force and previously granted to the same inventor in a foreign country will be so limited as to expire at the same time with such foreign patent, or, if there be more than one, at the same time with the one having the shortest unexpired term, but in no case will it be in force more than seventeen years.

Applications.

Application for a patent must be made in writing to the Commissioner of Patents. The applicant must also file in the Patent Office a written description of the invention, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he must explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions, and particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery. The specification and claim must be signed by the inventor and attested by two witnesses.

The applicant shall also make oath that he verily believes himself to be the original, sole, and first inventor or discoverer of the art, machine, manufacture, composition, or improvement, for which he solicits a patent; that he does not know and does not believe the same was ever before known or used; that it has not been in public use or on sale for more than two years; and shall state of what country he is a citizen. Such oath may be made before any person within the United States authorized by law to administer oaths, or, when the applicant resides in a foreign country, before any minister, charge d'affairs, consul, or commercial agent holding commission under the Government of the United States, or before any notary public of the foreign country in which the applicant may be.

When the nature of the case admits of drawings, the applicant must furnish one copy signed by the inventor or his attorney in fact, and attested by two witnesses, to be filed in the Patent Office. In all cases which admit of representation by model, the applicant, if required by the Commissioner, shall furnish a model of convenient size to exhibit advantageously the several parts of his invention or discovery. Or, if the invention or discovery is a composition of matter, the applicant may be required to furnish specimens of ingredients and of the composition, sufficient in quantity for the purpose of experiment.

On the filing of such application and the payment of the fee required by law, the same will be duly examined and if, after such examination, it appears that the claimant is justly entitled to a patent under the law, and that the same is sufficiently useful and important, the Commissioner will issue a patent therefor.

All applications for patents shall be completed and prepared for examination within one year after the filing of the application, and in default thereof, or upon failure of the applicant to prosecute the same within one year after any action therein, of which notice shall have been given to the applicant, they shall be regarded as abandoned by the parties thereto, unless it be shown to the satisfaction of the Commissioner of Patents that such delay was unavoidable.

Assignments.

Every patent or any interest therein shall be assignable in law by an instrument in writing; and the patentee, or his assigns or legal representatives may, in like manner, grant and convey an exclusive right under his patent to the whole or any specified part of the United States. Such an assignment, grant, or conveyance, shall be void as against any subsequent purchaser or mortgagee for a valuable consideration, without notice, unless it is recorded in the Patent Office within three months from the date thereof.

If any such assignment, grant, or conveyance of any patent shall be acknowledged before any Notary Public of the several States or Territories, or the District of Columbia, or any Commissioner of the

United States Circuit Court, or before any Secretary of Legation or Consular Officer authorized to administer oaths or perform notarial acts under Section 1750, Revised Statutes, the certificate of such acknowledgment, under the hand and official seal of such notary or other officer, shall be prima facie evidence of the execution of such assignment, grant or conveyance.

Reissures.

A reissue is granted to the original patentee, his legal representatives, or the assignees of the entire interest when, by reason of a defective or insufficient specification, or by reason of the patentee claiming as his invention or discovery more than he had a right to claim as new, the original patent is inoperative or invalid, provided the error has arisen from inadvertence, accident, or mistake, and without any fraudulent or deceptive intention. The applications must be made and the specification sworn to by the inventors, if they be living.

Caveats.

A caveat under the patent law is a notice given to the Patent Office of the caveator's claim as inventor, in order to prevent the grant of a patent to another for the same alleged invention upon an application field during the life of the caveat without notice to the caveator.

Any citizen of the United States who has made a new invention or discovery, and desires further time to mature the same, may, on payment of a fee of $10, file in the Patent Office a caveat setting forth the object and the distinguishing characteristics of the invention, and praying protection of his right until he shall have matured his invention. Such caveat shall be filed in the confidential archives of the Office and preserved in secrecy, and shall be operative for the term of one year from the filing thereof. If, during the life of the caveat, another inventor files an application for patent for substantially the same invention, the caveator will be notified to that effect, and given a certain time in which to file an application for patent for his own invention. Should the two applications then interfere, each party will be given an opportunity to prove priority of invention, and the patent will be granted to that party whom the Patent Office, after considering all the proofs, considers to be the original and first inventor.

An alien has the same privilege, if he has resided in the United States one year next preceding the filing of his caveat, and has made oath of his intention to become a citizen.

The caveat must comprise a specification, oath, and, when the nature of the case admits of it, a drawing, and, like the application, must be limited to a single invention or improvement.

Fees.

Fees must be paid in advance, and are as follows: On filing each original application for a patent, $15. On issuing each original patent, $20. In design cases: For three years and six months, $10; for seven years, $15; for fourteen years, $30. On filing each caveat, $10. On every application for the reissue of a patent, $30. On filing each disclaimer, $10. For certified copies of patents and other papers, including certified printed copies, ten cents per hundred words. For recording every assignment, agreement, power of attorney, or other paper, of three hundred words or under, $1; of over three hundred and under one thousand words, $2; of over one thousand words, $3. For copies of drawings, the reasonable cost of making them.

COPYRIGHT LAW OF THE UNITED STATES.

1. A *printed* copy of the title of the book, map, chart, dramatic or musical composition, engraving, cut, print, photograph, or chromo, or a

description of the painting, drawing, statue, statuary, or model or design for a work of the fine arts, for which copyright is desired, must be delivered to the Librarian of Congress or deposited in the mail, within the United States, *prepaid*, addressed

LIBRARIAN OF CONGRESS, Washington, D. C.

This must be done on or before day of publication in this or any foreign country.

The *printed title* required may be a copy of the title page of such publications as have title pages. *In other cases the title must be printed expressly for copyright entry*, with name of claimant of copyright. The style of type is immaterial, and the print of a typewriter will be accepted. But a separate title is required for each entry, and *each* title must be printed on paper as large as commercial note. The title of a *periodical* must include the date and number; and each number of the periodical requires a separate entry of copyright.

2. The legal fee for *recording* each copyright claim is 50 cents, and for a *copy* of this record (or certificate of copyright under seal of the office) an additional fee of 50 cents is required, making $1, if certificate is wanted, which will be mailed as soon as reached in the records. Publications which are the production of persons not citizens or residents of the United States, the fee for recording title is $1, and 50 cents additional for a copy of the record. Certificates covering more than one entry in one certificate are not issued.

3. Not later than the day of publication in this country or abroad, two complete copies of the best edition of each book or other article must be delivered, or deposited in the mails within the United States addressed

LIBRARIAN OF CONGRESS, Washington, D. C.

to perfect the copyright.

The freight or postage must be prepaid, or the publications inclosed in parcels covered by printed Penalty Labels, furnished by the Librarian, in which case they will come FREE by mail (*not express*), without limit of weight, according to rulings of the Post Office Department. Books must be printed from *type set or plates made in the United States;* photographs from *negatives made in the United States;* chromos and lithographs from *drawings on stone or transfers therefrom made in the United States.*

The deposit of copies above specified is an imperative requirement and copyright is incomplete and void and of no force or effect unless the same has been complied with. A penalty of $25 is also incurred. No copy is required to be deposited elsewhere.

The law requires one copy of each new edition, wherein any substantial changes are made, to be deposited with the Librarian of Congress.

4. No copyright is valid unless notice is given by inserting in every copy published, on the title page or the page following, if it be a book; or if a map, chart, musical composition, print, cut, engraving, photograph, painting, drawing, chromo, statue, statuary, or model or design intended to be perfected as a work of the fine arts, by inscribing upon some portion thereof, or on the substance on which the same is mounted, the following words, viz.: "*Entered according to act of Congress, in the year——, by————, in the office of the Librarian of Congress, at Washington,*" or at the option of the person entering the copyright, the words: "*Copyright 18—, by————.*" This notice *must* be in either of the two forms above given which are in the exact language of the statute, and failure to observe this strictly affords a loop hole for pirates to avoid the copyrights of others.

The law imposes a penalty of $100 upon any person who has not obtained copyright who shall insert the notice "*Entered according to act of Congress,*" or "*Copyright,*" etc., or words of the same import, in or upon any book or other article.

5. The copyright law secure to authors and their assigns the exclusive right to translate or to dramatize any of their works; no notice or record is required to enforce this right.

6. The original term of copyright runs for twenty-eight years. *Within six months before* the end of that time, the author or designer, or his widow or children, may secure a renewal for the further term of fourteen years, making forty-two years in all. Applications for renewal must be accompanied by a printed title and fee; and by explicit statement of ownership, in the case of the author, or of relationship, in the case of his heirs, and must state definitely the date and place of entry of the original copyright. Within two months of date of renewal the record thereof must be advertised in an American newspaper for four weeks.

7. The time of publication is not limited by any law or regulation, but the courts have held that it should take place within a reasonable time. A copyright may be secured for a projected as well as for a complete work. But the law provides for no *caveat*, or notice of interference—only for actual entry of title.

8. Copyrights are assignable by any instrument of writing. Such assignment, to be valid, is to be recorded in the office of the Librarian of Congress within sixty days from execution. The fee for this record and certificate is one dollar, and for a certified copy of any record of assignment, one dollar.

9. A copy of the record (or duplicate certificate) of any copyright entry will be furnished under seal of the office, at the rate of fifty cents each.

10. In the case of books published in more than one volume, or of periodicals published in numbers, or of engravings, photographs, or other articles published with variations, a copyright must be entered for each volume or part of a book, or number of a periodical, or variety, as to style, title, or inscription, of any other article. To *complete* the copyright on a book published serially in a periodical, two copies of each serial part as well as of the complete work (if published separately), should be deposited.

11. To secure copyright for a painting, statue, or model or design intended to be perfected as a work of the fine arts, a definite title and description must accompany the application for copyright, and a mounted photograph of the same, as large as "cabinet size," mailed to the Librarian of Congress not later than the day of publication of the work or design.

The fine arts, for copyright purposes, include only painting and sculpture, and articles of merely ornamental and decorative art should be sent to the Patent Office, as subjects for Design Patents.

12. Copyrights cannot be granted upon Trade-Marks, nor upon names of companies, libraries, or articles, nor upon an idea or device, nor upon prints or labels intended to be used for any article of manufacture. If protection for such names or labels is desired, application must be made to the Patent Office, where they are registered, if admitted, at a fee of $6 for labels, and $25 for trade-marks. The names of newspapers, periodicals, books, etc., come within the trade-mark law and are not copyrightable.

13. The provisions as to copyright entry in the United States by foreign authors, etc., by act of Congress approved March 3, 1891, (which took effect July 1, 1891), are the same as the foregoing, except as to productions of persons, not citizens or residents, which must cover return postages, and are $1 for entry, or $1.50 for entry and certificate of entry (equivalent to 4*s*. 5*d*. or 6*s*. 7*d*.). All publications must be delivered to the Librarian at Washington free of charge. The free penalty labels cannot be used outside of the United States.

The right of citizens or subjects of a foreign nation to copyright in the United States extends by Presidential proclamations of July 1, 1891, April 15, and October 31, 1892, to Great Britain, France, Belgium, Switzerland, Germany, and Italy.

14. Every applicant for a copyright should state distinctly the full name and residence of the claimant, and whether the right is claimed as author, designer, or proprietor. No affidavit or witness to the application is required.

RECORD OF PHOTOGRAPHIC PATENTS.

Granted by the United States Patent Office Between the First Day of September, 1897, and the Thirty-First Day of August, 1898, Inclusive.

Also containing a record of design patents issued and trade-marks registered within the same period.

Compiled by William S. Hodges, Patent Lawyer, Washington, D. C.

ACTINOMETERS.

600,484 dated March 8th, 1898. Actinometer.
G. F. Wynne, Plasgwyn, England.
610,028 dated August 30th, 1898. Actinometer.
J. A. Cheape, Charlottesville, Va.

BATHS.

608,147 dated July 26th, 1898. Photographic Developer.
Alfred Bogisch, Feuerbach, Germany.

BURNISHING.

596,268 dated December 28th, 1897. Polishing Roll for Photographic Burnishers.
A. H. Humphrey, Kalamazoo, Mich.

CAMERAS.

598,569 dated February 8th, 1898. Photographic Camera.
J. P. Meyer, Rochester, N. Y.
598,701 dated February 8th, 1898. Photographic Camera.
H. and C. Gamwell, Liverpool, England.
606,593 dated June 28th, 1898. Photographic Copying Camera.
H. Stender, Prospect Park, Cal.
606,594 dated June 28th, 1898. Photographic Copying Camera.
H. Stender, Prospect Park, Cal.

CAMERAS, MULTIPLYING ATTACHMENTS.

597,268 dated January 11th, 1898. Photographic Camera.
C. A. Dake, F. P. Shepard, and F. S. Peck, Oklahoma Territory.
600,515 dated March 15th, 1898. Photographic Cameras.
J. Collier, Denver, Colo.
604,268 dated May 17th, 1898. Photographic Plate-Holder for Three Color Processes.
G. Selle, Brandenburg, Germany.

CAMERAS, MAGAZINE.

589,475 dated September 7th, 1897. Magazine Camera.
H. W. Locke, Rochester, N. Y.
593,010 dated November 2nd, 1897. Photographic Camera.
A. H. Bromley, Jr., Philadelphia, Pa.
595,036 dated December 7th, 1897. Photographic Camera.
E. Block, Paris, France.
595,285 dated December 14th, 1897. Magazine Camera.
P. Berggren, Lake City, Minn.
595,551 dated December 14th, 1897. Photographic Camera.
J. L. Atwater, Western Springs, Ills.
595,591 dated December 14th, 1897. Magazine Camera.
J. L. Atwater, Western Springs, Ills.
598,728 dated February 8th, 1898. Photographic Camera.
H. and C. Gamwell, Liverpool, England.
598,804 dated February 8th, 1898. Photographic Camera.
J. A. Mosher, Chicago, Ills.
599,188 dated February 15th, 1898. Magazine Camera.
J. A. Mosher, Chicago, Ills.

599,314 dated February 22nd, 1898. Magazine Camera.
K. E. AND F. V. CONLEY, Spring Valley, Minn.
599,596 dated February 22nd, 1898. Photographic Magazine Camera.
E. E. FLORA, Chicago, Ills.
604,204 dated May 17th, 1898. Magazine Camera.
J. J. CHASE, Newburyport, Mass.

CAMERAS, KINETOGRAPHIC.

590,766 dated September 28th, 1897. Kinetographic Camera.
F. MORAND, Aix-les-Bains, France.
593,376 dated November 9th, 1897. Kinetographic Camera.
H. J. HEINZE, London, England.
594,094 dated November 23rd, 1897. Kinetographic Camera.
N. NELSON, Waukegan, Ills.
595,620 dated December 14th, 1897. Kinetographic Camera.
P. GAUTIER, Paris, France.
596,687 dated January 4th, 1898. Kinetographic Camera.
E. UNGER AND P. F. KRUG, New York, N. Y.
600,113 dated March 1st, 1898. Apparatus for Photographing Objects in Motion and for Projecting Pictures.
W. LATHAM, New York, N. Y.
601,951 dated April 5th, 1898. Kinetographic Camera.
W. B. DAVIS, Brooklyn, N. Y.
604,733 dated May 31st, 1898. Kinetographic Camera.
W. H. DANIELS, New York, N. Y.
607,783 dated July 19th, 1898. Kinetographic Camera.
F. H. MORSE, St. Louis, Mo.

CAMERA STANDS.

591,877 dated October 19th, 1897. Camera Holder.
I. F. PHEILS, Woodville, Ohio.
604,990 dated May 31st, 1898. Photographic Camera Stand.
M. LEVY, Philadelphia, Pa.

COLORING.

600,132 dated March 8th, 1898. Coloring Photographs.
DAVID BAKER, Kansas City, Mo.

DARK ROOMS.

606,318 dated June 28th, 1898. Automatic Apparatus for Taking Photographs.
R. W. VINING, London, England.
609,661 dated August 28th, 1898. Photographic Developing Apparatus.
A. S. COBENZL, Höchst, Germany.

EMBOSSING.

607,147 dated July 12th, 1898. Producing Relief Photographs.
H. M. WADE, New York, N. Y.

FINDERS.

605,245 dated June 7th, 1898. Photographic Finder.
H. B. CARLTON, Rochester, N. Y.
607,583 dated July 19th, 1898. Photographic Finder.
O. BENTZ, Paris, France.

FOCUSING DEVICES.

606,394 dated June 28th, 1898. Focusing Attachment for Cameras.
D. E. SHARETTS, Washington, D. C.

KINETOSCOPES.

590,837 dated September 28th, 1897. Means for Guiding Kinetoscope Films.
L. E. HEURIET, Newark, N.Y.
591,452 dated October 12th, 1897. Picture-Displaying Apparatus. Re-issued February 15th, 1898. No. 11,650.
F. S. CHANCE, Indianapolis, Ind,

597,759 dated January 25th, 1898. Consecutive View Apparatus.
H. Casler, Canastota, N.Y.
603,771 dated May 10th, 1898. Projecting Kinetoscope.
J. N. Maskelyne, Jr., London, England.
606,993 dated July 5th, 1898. Device for Obtaining Stereoscopic Effects in Exhibiting Pictures.
C. F. Jenkins, Washington, D.C.
607,761 dated July 19th, 1898. Exhibitor for Series Pictures.
F. H. Morse, St. Louis, Mo.

LENSES.

591,466 dated October 12th, 1897. Lens.
L. Gathmann, Chicago, Ills.
599,700 dated March 1st, 1898. Combined Lens for Photographic Purposes.
C. P. Goerz, and E. von Höegh, Schōnberg, Germany.

MAGIC LANTERNS.

590,903 dated September 28th, 1897. Lantern Slide Moving Device.
H. Newman, New York, N.Y.
592,575 dated October 26th, 1897. Stereopticon.
W. S. Scales, Everett, Mass.
593,069 dated November 2nd, 1897. Automatic Cut Off for Magic Lanterns.
J. H. James, Rockville, and C. D. Barrow, Glastonbury, Conn.
594,819 dated November 30th, 1897 Optical Lantern.
S. W. Allen, New York, N.Y.
595,165 dated December 7th, 1897. Magic Lantern.
W. M. Green, Evanston, and F. W. Smith, Chicago, Ill.
595,541 dated December 14th, 1897. Advertising Apparatus.
J. H. Hallen, Providence, R.I.

MECHANICAL PRINTING.

591,653 dated October 12th, 1897. Half Tone Screep
M. Levy, Philadelphia, Pa.

PHOTOMETERS.

598,649 dated September 7th, 1897. Photometer.
J. L. Fuelling, Peoria, Ills.

PLATE HOLDERS.

592,148 dated October 19th, 1897. Photographic Plate Wrapper.
C. A. Lindsay, Washington, D.C.
600,179 dated March 8th, 1898. Photographic Plate Holder.
J. F. Short, California, Mo.
600,638 dated March 15th, 1898. Photomechanical Plate Holder.
H. Goodwin, Newark, N.J.
603,972 dated May 10th, 1898. Photographic Plate Holder.
J. Schaub, Salt Lake City, Utah.
604,455 dated May 24th, 1898. Photographic Plate Holder.
F. A. Brownell, Rochester, N.Y.
607,054 dated July 12th, 1898. Photographic Plate Holder.
J. C. Kimsey, Philadelphia, Pa.

PLATE HOLDERS, MAGAZINE.

607,052 dated July 12th, 1898. Photographic Plate Carrying and Transferring Case.
J. C. Kimsey, Philadelphia, Pa.
607,053 dated July 12th, 1898. Photographic Plate Magazine.
J. C. Kimsey, Philadelphia, Pa.

PRINTING AND VIGNETTING.

594,366 dated November 20th, 1897. Photographic Printing Apparatus.
E. K. Adams, New York, N.Y.
599,440 dated February 22nd, 1898. Photographic Printing Frame.
J. E. Crooks, Montevista, Colo.
601,882 dated April 5th, 1898. Photographic Printing Apparatus.
A. Schwarz, Berlin, Germany.
601,883 dated April 5th, 1898. Photographic Printing Apparatus.
A. Schwarz, Berlin, Germany.

608,713 dated May 10th, 1898. Photographic Printing Frame.
E. W. Sweigard, Chicago, Ill.
607,648 dated July 19th, 1898. Continuous Photographic Printing Apparatus.
A. Schwarz, Berlin, Germany.

PROCESSES.

603,936 dated May 10th, 1898. Photographic Opaque Negative and Process of Printing therefrom.
N. Bouvang, Rockford, Ill.
604,269 dated May 17, 1898. Photographs in Natural Colors.
Gustav Selle, Brandenburg, Germany.
608,934 dated August 9th, 1898. Process of Producing Photographs in Colors.
V. Vancamp, Paris, France.

RETOUCHING.

603,765 dated May 10th, 1898. Photographic Retouching Table.
W. E. Harding, South Framingham, Mass.

ROLL HOLDERS.

580,204 dated September 21st, 1897. Roll-Holding Flash Light Camera.
J. E. Blackmore, Newark, N. J.
591,346 dated October 5th, 1897. Sensitized Photographic Film.
W. V. Esmond, New York, N. Y.
594,120 dated November 23rd, 1897. Photographic Camera.
D. P. O'Leary, and S. B. Kull, New York, N. Y.
594,368 dated November 30, 1897. Photographic Camera.
C. F. Ames, and H. A. Rearson, Boston, Mass.
594,458 dated November 30th, 1897. Film Spool.
J. C. Carbutt, Philadelphia, Pa.
595,468 dated December 14th, 1897. Photographic Camera.
W. F. Cook, Ivy Mills, Pa.
597,857 dated January 25th, 1898. Roll-Holding Camera.
E. P. Pasquier, Paris, France.
605,851 dated June 21st, 1898. Photographic Camera.
F. A. Brownell, Rochester, N. Y.
607,428 dated July 19th, 1898. Roll-Holding Camera.
W. V. Esmond, New York. N. Y.
608,153 dated July 26th, 1898. Roll-Holding Camera.
H. E. Bryant, Boston, Mass.
610,153 dated August 30th, 1898. Photographic Camera.
H. A. Brownell, Rochester, N. Y.

SHUTTERS.

590,752 dated September 28th, 1897. Photographic Camera Shutter.
W. F. Cook, Ivy Mills, Pa.
591,347 dated October 5th, 1897. Photographic Shutter.
W. V. Esmond, New York, N. Y.
599,576 dated February 22nd, 1898. Photographic Shutter Operating Lever.
H. White, Flushing, N. Y.
599,670 dated February 22nd, 1898. Color Value Curtain Shutter.
F. J. Harrison, Orange, N. J.
607,242 dated July 12th, 1898. Photographic Shutter.
C. F. H. Huff and O. C. Hale, Cincinnati, Ohio.
608,875 dated August 9th, 1898. Photographic Shutter.
G. C. O. Lange, Creskill, N. J.
609,033 dated August 16th, 1898. Photographic Shutter.
H. W. Locke, Rochester, N. Y.
610,154 dated August 30th, 1898. Photographic Shutter.
F. A. Brownell, Rochester, N. Y.

STEREOSCOPES.

590,922 dated September 28th, 1897. Stereoscope Frame.
H. S. Walbridge, North Bennington, Vt.
592,693 dated October 26th, 1897. Graphoscope.
L. H. Cohen, New York, N. Y.
597,440 dated January 18th, 1898. Stereoscope.
B. L. Singley, Meadville, Pa.
597,520 dated January 18th, 1898. Stereopticon.
W. A. Fried, Hamburg, Germany.

598,938 dated February 15th, 1898. Slide Carrier.
W. Johnson, Chicago, Ills.
607,171 dated July 12th, 1898. Optical Instrument.
H. H. Hill, Chicago, Ills.
Reissue 11,638 dated November 16th, 1897. Stereopticon or other Binocular Instrument.
H. C. White, North Bennington, Vt.

SURFACES, SENSITIVE.

593,775 dated November 16th, 1897. Matt Surface Photographic Paper.
M. W. McDonald, Polk, Ohio.

TRAYS AND TANKS.

590,632 dated September 28th, 1897. Photographic Print Washer.
F. Shurig, Huntinburg, Ind.
600,273 dated March 8th, 1898. Photographic Negative Rack.
J. H. Smith, Chicago, Ills.
605,229 dated June 7th, 1898. Photographic Print Washer.
W. H. Leigh, Beaver Falls, Pa.
606,727 dated July 5th, 1898. Photographic Film Holder.
C. M. Mali, New York, N. Y.
607,485 dated July 19th, 1898. Photographic Developing Tray.
W. H. Rose, Baltimore, Md.
607,649 dated July 19th, 1898. Apparatus for Treating and Washing Photographic Paper.
A. Schwarz, Berlin-Schönberg, Germany.
607,677 dated July 19th, 1898. Photographic Plate Washer.
W. H. Bierwirth, Torrington, Conn.
608,871 dated August 9th, 1898. Photographic Plate Washer.
J. Kirkwood, Lenox, Mass.
609,677 dated August 23rd, 1898. Apparatus for Developing Photographic Films.
J. S. Johnston, New York City.
609,900 dated August 30th, 1898. Photographic Negative Washer.
W. Neil, Chicago, Ills.

TRIPODS.

590,636 dated September 28th, 1898. Attachment for Photographers' Tripods.
A. F. Walter, Chatsworth, Ills.
600,654 dated March 15th, 1898. Tripod.
J. F. Sullivan, Providence, R. I.
606,022 dated June 21st, 1898. Tripod Stand for Cameras, etc.
R. T. Patchel, Cambridge, Mass.
608,850 dated August 9th, 1898. Tripod.
W. F. Folmer, New York City.

DESIGNS.

27,497. Card Mount. Granted to J. P. Odgers, Philadelphia, Pa., for seven years.
27,498. Card Mount. Granted to D. D. Dunklee, Greenfield, Mass , for seven years.

TRADE MARKS.

30,564. The American Mutoscope Co., New York, N. Y.
Essential feature the word "Biograph" applied to Consecutive View or Moving Picture Apparatus.
30,681. The American Mutoscope Co., New York, N. Y.
Essential feature the word "Mutoscope" applied to Consecutive View or Moving Picture Apparatus. Used since January 1st, 1897.
30,877. Bostwick, Harrison & Co., Brooklyn, N. Y.
Essential feature the word "Trenol" applied to Developers for Photographic Plates in Granular or Powdered Form. Used since July 1st, 1897.
30,934. T. C Marceau, San Francisco, Cal.
Essential feature the word "Renaissance" applied to Photographs and Photographic Pictures. Used since May, 1897.
30,967. Nepera Chemical Co., Yonkers, N. Y., Chicago, Ills., and Paris, France.
Essential feature the word "Nepera" applied to Photographic Papers and Chemicals. Used since January 4th, 1894.
31,002. Vive Camera Co., Chicago, Ills.
Essential feature the word "Vive" applied to Photographic Supplies. Used since June 1st, 1896.
31,058. Nepera Chemical Co., Yonkers, N. Y., Chicago, Ills., and Paris, France.
Essential feature the word "Velox" applied to Sensitized Developing Paper. Used since August 6th, 1895.

31,110. NEPERA CHEMICAL CO., Yonkers, N. Y., Chicago, Ills., and Paris, France.
Essential feature the representation of a "Liebig Potash Bulb" applied to Photographic Paper and Chemicals. Used since January 4th, 1894.

31,234. NEPERA CLEMICAL CO., Yonkers, N. Y., Chicago, Ills., and Paris, France.
Essential feature the word "Platinoid" applied to Photographic Paper. Used since August 25th, 1894.

31,235. J. HAUFF, Feuerbach, Germany.
Essential feature the word "Ortol," applied to Photographic Developers. Used since July 31th, 1897.

31,236. J. HAUFF, Feuerbach, Germany.
Essential feature the word "Carbonal," applied to Photographic Developers. Used since October 1st, 1897.

31,337. ACTIEN GESELLSCHAFT FUR ANILIN FABRIKATION, Berlin, Germany.
Essential feature the word "Diogen," applied to Photographic Developers. Used since December 12th, 1897.

31,338. THE HEINN SPECIALTY CO., Milwaukee, Wis.
Essential feature the word "Photogs," applied to Photographic Albums, Photographic Portfolios, and Cases for Preserving Films. Used since November 15th, 1897.

31,480. REICHENBACH, MOREY AND WILL CO., Rochester, N. Y.
Essential feature the word "Velutype," applied to Photographic Printing-Out Paper and Prints Made Thereon. Used since November 15th, 1897.

31,481. REICHENBACH, MOREY & WILL CO., Rochester, N. Y.
The word "Victor," applied to Photographic Printing-Out Paper. Used since May 16th, 1897.

31,482. REICHENBACH, MOREY & WILL CO., Rochester, N. Y.
Essential feature the word "Vera,"applied to Photographic Printing-Out Paper. Used since May 16th, 1897.

31,574. RADIOTINT, LIMITED, London, England.
Essential feature the representation of the "Head and Fore Quarters of a Unicorn," applied to certain named Photographic Material, Apparatus, and Products. Used since October, 1897.

31,617. CURTIS & CAMERON, Boston, Mass.
Essential feature "A Portrait of the Late John Singleton Copley," applied to Art Photographs. Used since March, 1898.

31,654. WESTERN CAMERA MANUFACTURING CO., Chicago and New York.
Essential feature the word "Royal," applied to Photographic Printing Paper. Used since February 1st, 1897.

31,655. RADIOTINT. LIMITED, London, England.
Essential feature a figure representing the "Assyrian Symbol of the Sun," applied to certain Photographic Apparatus and Material. Used since October, 1897.

31,706. CURTIS & CAMERON, Boston, Mass.
Essential feature the word "Copley," applied to Art Photographs. Used since March, 1896.

RATES OF DOMESTIC POSTAGE

TO ANY PART OF THE UNITED STATES, CANADA, OR MEXICO.

SEE NOTE H.

	cts.	oz.	See Spec'l Note.
Address Tags	1	1	*a*
Bill Heads	1	1	*a*
Blotters (printed)	1	1	*a*
Blue Prints	1	2	*d*
Books, printed	1	2	*d*
Cards, playing	1	1	*a*
" printed			
" business			
" Christmas, etc.‡	1	2	*a*
" Easter‡			
" New Year‡			
Chromos‡	1	2	*a*
Catalogues	1	2	*d*
Circulars	1	2	*d*
Coins	1	1	*a b*
Copy (MSS.)	2	1	*e*
" (with proof sheets)	1	2	*e*
Crayon	1	1	
Desk Blotters	1	1	*a*
Drawings / Designs } Pen or Pencil	1	1	* *e*
Easter Cards‡	1	2	*a*
Engravings	1	2	*a*
Handbills	1	2	*a*
Letters	2	1	*e*
Labels (printed)	1	2	*a*
Lithographs	1	2	*a*
Manifold Letters	2	1	*e*
Manuscript	2	1	*e*
Magazines	1	4	*d*
Merchandise	1	1	*a b*
Maps (printed)	1	2	*e*
Newspapers	1	4	*d*
New Year Cards‡	1	2	
Packages, sealed	2	1	*b*

	cts.	oz.	See Spec'l Note.
Packages, unsealed	1	1	† *b*
Pamphlets	1	2	*d*
Patterns (cut)	1	1	*a*
Periodicals	1	4	*d*
PHOTOGRAPHS	1	2	*d*
Pictures (scrap)	1	2	
Playing Cards	1	1	*a*
Postal Cards	1	ea.	*f*
Printed Matter (*not merchandise or samples*)	1	2	*d*
Printed Envelopes	1	1	*a*
Prospectuses	1	2	*d*
Proof Sheets	1	2	*dg*
Plans (in writing)	2	1	*e*
Registration	8	ea.	*i*
Samples	1	1	*b*
Sample copies of regular publications mailed by publisher (second-class)	1	lb.	
Sample copies of regular publications not mailed by publisher	1	4	*a*
Scrap Pictures	1	2	*a*
Seeds, Plants, etc.	1	2	
Specie	1	1	*a b*
Stereoscopic Views	1	2	*d*
Tickets	1	2	*a*
Type Writer Work	2	1	*e*
Valentines (if printed without embellishment with silk, satin, etc.)	1	2	*a*
Visiting Cards (printed)	1	2	*a*

* If pen or pencil drawings contain no written letters, figures, or words, they are fourth class matter, otherwise first class.

† May be either third or fourth class.

‡ Third-class matter if printed on paper; if on silk, eotton, satin, canvas, or other material than paper or paper board, fourth class matter.

GENERAL NOTES.

Cards, circulars, catalogues, etc., relating to the business of one or more firms, and different articles of all kinds and classes, may be placed in the same package, provided that the highest rate of postage that any part of the contents is subject to shall be prepaid on the whole package.

The following articles are unmailable, and will not be dispatched in any case :—Spirituous, malt, or vinous liquids, poisons, explosive matter, inflammable articles, live or dead animals, insects (except queen bees when safely secured), substances exhaling a bad odor, fresh fruits and vegetables, obscene or indecent books, prints, writings, or papers; all postal cards or letters on the envelopes of which lewd, obscene, or lascivious deliniations, offensive duns, epithets, terms, or language are written or printed, all matter concerning lotteries or schemes devised and intended to defraud the public, or for the purpose of obtaining money under false pretences, and all mail matter not addressed to a post-office or to no particular person, firm, company, or publication.

Special Delivery.—Any mail matter, when bearing, in addition to the regular postage, a "special delivery" stamp (face value, ten cents), will be immediately delivered by special messenger on its arrival at destination, between the hours of 7 A.M. and 7 P.M., and within one mile from the post-office, if it be not a letter-carrier office. At letter-carrier offices special delivery is obligatory within the carrier limits, and between the hours of 7 A.M. and 11 P.M.

Note A.

Fourth Class Matter.—All Matter Not Included in First, Second and Third Classes.—Weight limited to 4 pounds. Postage must be fully prepaid. The rate is *one cent an ounce or fraction thereof.* Fourth Class matter may have printing on it or on the wrapper. Written marks, in addition to the address, are allowed on Fourth Class matter as follows:—The name and address of the sender preceded by the word "From"; and any names, numbers, marks, or letters for the pupose of description. A request to the delivering Postmaster may also be written asking him to notify sender if the package is not delivered, and the amount required to prepay postage for its return.

Note B.

Articles of the Fourth Class liable to injure or deface the mails, such as glass, needles, nails, pens, etc., must first be placed in a bag, box or open envelope, which must then be inclosed in another outside tube or box made of metal or hardwood, without sharp corners or edges and having a sliding clasp or screw lid, thus securing the articles in a double package; if the articles are fragile, they must be packed with sawdust, cotton or other packing material in the inside pocket. Powdered articles, such as flour, sugar, etc., may be inclosed in a transparent bag or envelope, and must be securely packed so as to prevent breaking. Admissible liquids and oils (not exceeding 4 ounces liquid measure), pastes, salves or articles easily liquefiable, must conform to the following conditions: When in glass bottles or vials, such bottles or vials must be strong enough to stand the shock of handling in the mails, and must be inclosed in a wooden or papier-mache block or tube *not less than three-sixteenths of an inch thick* in the thinnest part, strong enough to support the weight of mails piled in bags and resist rough handling; and there must be provided, between the bottle and its wooden case, a cushion of cork crumbs, cotton, felt, asbestos, or some other absorbent, sufficient to protect the glass from shock in handling; the block or tube impervious to liquids, including oils, etc., to be closed by a tightly fitting screw-lid of wood or metal, with a rubber or other pad so adjusted as to make the block or tube water-tight and to prevent the leakage of the contents in case of breaking of the glass. When inclosed in a tin cylinder, metal case or tube, such cylinder, case or tube should have a screw-lid with a rubber or cork cushion inside in order to make the same water-tight, and should be securely fastened in a wooden or papier-mache block (open only at one end), and not less in thickness and strength than above prescribed. Manufacturers or dealers intending to transmit articles or samples in considerable quantities, should submit a sample package, showing their mode of packing, to the Postmaster at the mailing office, who will see that the conditions of this section are carefully observed.

Note D.

Third Class Matter—Prepayment.—Postage must be fully prepaid, otherwise the matter will be "held for postage." The rate is *one cent for every two ounces or fraction thereof. The limit of weight is* 4 pounds, except on single books. Writing.—No writing is permitted on Third Class matter, except as follows: The name and address of the sender on the outside or inside of package, preceded by the word "From," and any printing not in the nature of personal correspondence. The sender is further allowed to mark a word or passage in a book or paper to which he desires to call special attention. He may also write a simple inscription or dedication upon the cover or blank leaf of a book or pamphlet. The date, address and signature of a circular may be written. Any other writing on Third Class matter will subject the package to letter rates of postage, and may render the sender liable to a fine of ten dollars. *Photographs* and *blue prints* must bear no other writing than the name of the view and of the sender.

Wrapping.—Mail matter of the Third Class must be so wrapped or inclosed that it can be readily examined without destroying the wrapper; otherwise it will be subject to postage at the First Class rate (two cents per ounce), as will all articles inclosed in sealed envelopes with clipped ends, sides or corners, or in boxes with covers secured by nails, and all packages the wrappers of which are secured to the inclosure by postage stamps.

Note E.

First Class.—This class includes letters, postal cards, sealed packages, all matter wholly or partly in writing (whether manuscript or produced by type-writer or copying press), drawings, designs, plans and maps, if they contain descriptive words, letters or figures in writing, produced by hand, manuscript for publication not accompanied by proof-sheets, and all personal correspondence, whether in writing or in print. (See under heads "Third Class," "Fourth Class," notes "A" and "D," certain writing permitted in or on articles of those classes.)

The rate of postage on mail matter of the First Class (sealed or unsealed) is *two cents for each ounce or fraction thereof*, excepting postal cards, and excepting also letters for *local delivery* posted at the post-offices where no letter-carriers are employed, in which case the rate is *one cent per ounce or fraction thereof.*

The law provides that the postage on all mail matter of the First Class shall be prepaid only by postage stamps or by inclosure in government stamped envelopes, and that any article of this class (not entitled by law to free transmission in the mails) deposited in a post-office wholly unpaid or prepaid *less than one full rate*, *cannot be forwarded or delivered*, but must be "held for postage." LIMIT OF WEIGHT.—There is no limit to the weight of letters or packages of First Class matter. WRAPPING OR ENCLOSURE.—Mail matter of the First Class may be wrapped or enclosed in any manner that the sender may desire. RETURN.—Letters not delivered will be returned to writer free, if a request to that effect is placed on the envelope. FORWARDING.—A letter will be forwarded by the Postmaster who may hold it, to another post-office, at the request of the person to whom the letter is addressed. Letters addressed to the care of another person, or erroneously delivered, may be redirected and returned within a reasonable time to post-office, and will be forwarded without additional charge.

The putting on of requests to return the matter to the sender in case of non-delivery is recommended by the Post-Office Department—not on first-class alone, but on all matter.

Note F.

POSTAL CARDS.—"Postal Cards" are those issued by authority of the Postmaster-General (the imitation of which is forbidden and punished by law). Nothing whatever may by attached to a Postal Card except an address label, which may be pasted to the message as well as the *address side*, and no printing or writing is permitted upon the address side of Postal Cards, except that imprinted thereon at the manufactory and such as may be necessary for the proper direction of the same. Postal Cards are unmailable as such when incomplete or mutilated, and in all cases where any of the above conditions are not complied with. Undelivered single Postal Cards are not returned to senders. 1. Cards must not exceed the size of what is now known as the "H" postal card, which is 3¼ by 5½ inches in dimensions, nor must they be smaller than the "K" postal card, the size of which is 2 15-16 by 4 15-16 inches. 2. The quality of the cards must be substantially that of the Government Postal Cards, and weigh about 6 pounds 3 ounces to the thousand. 3. The color of the cards may be white, cream, light gray, or the shade of the government card, which is light buff. 4. The cards must bear these words, in print, on the address side: "Private Mailing Card—Authorized by act of Congress of May 19, 1898." When prepared by printers or stationers for sale, they should also bear in the upper right-hand corner of the address side an oblong diagram with the words, "Place a one-cent stamp here"; and in the lower left-hand corner the following words should be printed: "This side is exclusively for the address." Nothing else than the superscription, which may be either in writing or print, but which must be limited to the name and address, and, if desired, the occupation or business of the addressee, briefly stated, will be allowable on the address side. 5. The message on the cards may be either in writing or print; and there may also appear on the message side advertisements, illustrations, or other matter printed either in black or in colors. 6. There must be attached to every card mailed a one-cent adhesive postage stamp. 7. The privilege given by the act is not intended to work a discontinuance of the Government postal cards. These will be issued and sold the same as heretofore. 8. Private mailing cards, with written messages, cannot be mailed to foreign countries except at the letter rate of postage.

Note G.

PROOF SHEETS may be corrected or uncorrected, with or without the original manuscript, additions to or alterations in the matter, or directions as to the typographical part of the work; but directions in writing as to binding, quality of paper, etc., are not permissible unless the letter rate of postage be paid.

Note H.

CANADA AND MEXICO.—Matter mailed in the United States, addressed to Mexico, is subject to the same postage rates and conditions as it would be if it were addressed for delivery in the United States, except that articles of miscellaneous merchandise (fourth-class matter) not sent as *bona-fide* trade samples, are required to be sent by "Parcels Post," and that the following articles are *absolutely excluded* from the mails without regard to the amount of postage prepaid, or the manner in which they are wrapped, viz.:

All sealed packages, other than letters in their usual and ordinary form; *all* packages (including packages of second-class matter, which weigh more than 4 pounds 6 ounces), except such as are sent by "Parcels Post;" liquids, pastes, confections and fatty substances; publications which violate any copyright law in Mexico.

Single volumes of printed books in *unsealed* packages, are transmissible to Mexico in the regular mails without limit as to weight.

"*Commercial Papers*," and *bona-fide* trade samples are transmissible to Mexico in the regular mails at the postage rate given above, opposite "Commercial Papers" and "Samples of Merchandise," respectively. See also Note 14, pp. 925 and 927 of the *United States Official Postal Guide* for January, 1894.

Matter mailed in the United States, addressed to Canada, is subject to the same postage rates and conditions as it would be if it were addressed for delivery in the United States, except that "Commercial Papers" are transmissible at the postage rate given above opposite "Commercial Papers"; that packages of seed, plants, etc., are subject to the postage rate of one cent per ounce, and that the following articles are *absolutely excluded* from the mails, without regard to the amount of postage prepaid, or the manner in which they are wrapped, viz.:

All sealed packages, other than letters in their usual and ordinary form; *all* packages (except single volumes of printed books and packages of second-class matter), which weigh more than 4 pounds 6 ounces; Police Gazettes; publications which violate any copyright law of Canada.

United States Postal Agency at Shanghai, China.—Articles addressed for delivery at the following places in China, viz.: Cheefoo (or Yenti), Chin Kiang, Chung King, Kaiping, Kalgan, Kiukiang, Nanking, Newchwang, Ningpo, Ourga, Peking, Hang Chow, Hankow, Ichang, Shanghai, Taku, Tientsin, Wenchow, Wuchang, Wuhu, are transmissible in the mails made up in San Francisco for the United States Postal Agency at Shanghai. See "Shanghai" in the Foreign Postage Table on page 20.

Note 1.

Registration.—All kinds of mail matter can he registered at the rate of eight cents for each package, in addition to the postage at regular rates, both postage and fee to be fully prepaid by stamps; all conditions as to marks, contents and method of securing packages being the same as described under the various classes (Notes A, D, E). Each package must bear name and address of sender, and a receipt will be returned from the person to whom addressed.

Domestic Money Orders.

For Orders not exceeding $2 50	$0 03
" exceeding $2 50 and not exceeding $5 00	05
" " 5 00 " " 10 00	08
" " 10 00 " " 20 00	10
" " 20 00 " " 30 00	12
" " 30 00 " " 40 00	15
" " 40 00 " " 50 00	18
" " 50 00 " " 60 00	20
" " 60 00 " " 75 00	25
" " 75 00 " " 100 00	30

(Postal Notes no longer issued.)

The sender of a money order must state the particulars thereof upon a form furnished by the post-office.

A money order may be endorsed once only.

The person who presents a money order for payment must be identified if unknown to the postmaster, unless the remitter upon his application waives identification.

A domestic money order may be repaid within a year at the office of issue. The fee will not be refunded.

Duplicates of lost or invalid money orders are issued by the department free of charge upon application made through the issuing or paying postmaster by remitter, payee or indorsee.

The issue of money orders on credit is prohibited.

A money order may be paid to a second person by endorsement of payee, or upon a written order or power of attorney to be filed with the paying postmaster.

Reproduction of a picture of E. LOÉVY

THRE COLOR PROCESS.

PAPER PRINTING AND ETCHING,
OF L. GEISLER, AUX CHATELLES
PAR RAON-L'ETAPE
VOSGES

INTERNATIONAL MONEY ORDERS.

International money orders may be drawn for payment in the following countries and places:

The fees for International Money Orders are as follows:

For sums not exceeding $10	$0 10	Over $50 and not exceeding $60	$0 60
Over $10 and not exceeding $20	20	" 60 " " 70	70
" 20 " " 30	30	" 70 " " 80	80
" 30 " " 40	40	" 80 " " 90	90
" 40 " " 50	50	" 90 " " 100	1 00

Order Should be Sent by Remitter to Payee.

*Alexandria, Egypt, if drawn as a French order.
Algeria.
Amoy, China.
Bahama Islands.
Bermudas.
Beyroot, Turkey, if drawn as a French order.
British Bechuanaland, South Africa.
British Guiana.
Canada.
Canton, China.
Cape Colony, South Africa.
Constantinople. Turkey, if drawn as British or French.
Foochow, China.
France.
Great Britain and Ireland.
Hankow, China.
Hawaiian Islands.
Hoihow, China.
Hong Kong, China.
Jamaica.
Leeward Islands.
Newfoundland.
New South Wales.
New Zealand.
Ningpo. China.
North Borneo or Sandakan.
Orange Free State, South Africa.
Panama.
Port Said, Egypt.
Queensland.
Retimo, Crete, if drawn as a French order.
Salonica, Turkey. if drawn as a French order.
Sarawak, Sandakan, Borneo.
Shanghai, China.
Smyrna, Turkey, if drawn as a French order.
South Australia.
Swatow, China.
Tangier, Morocco, if drawn as on French.
Tasmania
The Dardanelles.
Transvaal, South Africa.
Tripoli, Africa.
Tobago, West Indies.
Tunis. Africa.
Trinidad, West Indies.
Victoria, Australia.
Windward Islands.
Zanzibar, Africa, if drawn as a French order.

Order May be Kept by Remitter as a Receipt.

Accra, Gold Coast, Africa.
Aden, Arabia.
Adrianople, Turkey.
*Alexandria, Egypt, if drawn as a British or Egyptian order.
Archipelago of Banca, Dutch East Indies.
Archipelago of Billiton, Dutch East Indies.
Archipelago of Riouw, Dutch East Indies.
Assab. Africa.
Austria-Hungary.
Avlona or Valona, Turkey.
Azores.
Bagamoyo, East Africa.
Bagdad, Turkey.
Banana, Congo Free State.
Bassorah. or Basra, Turkey.
Bathurst, Gambia, Africa.
Belgium.
Belize. British Honduras.
Beluchistan, Asia.
Beyroot, Turkey. if drawn as British or Austrian.
Boma, Congo Free State.
Borneo.
Bosnia.
British Honduras.
Bulgaria.
Bunder Abbas or Gombroon, Persia.
Burmah, Asia.
Bushire. or Abu'-Shehr, Persia.
Caipha (or Haifa), Turkey.
Cameroons, Cameroons, Africa.
Candia, Crete, Turkey.
Canea, Crete, Turkey.
Cape Coast Castle, Gold Coast, Africa.
Celebes.
Ceylon.
Chios or Seio, Turkey in Asia.
Constantinople, Turkey, if drawn as Austrian.
Cyprus.
Danish West Indies.
Dar es Salaam, Africa.
Denmark.
Durazzo, Turkey.
Dutch East Indies.
Egypt.
Falkland Islands.
Faroe Islands.
Fiji Islands.
Finland.
Gambia, Africa.
Germany.
Gibraltar.
Gold Coast Colony, Africa.
Guadur or Gwadel. Beluchistan.
Haifa or Caipha, Turkey.
Heligoland.
Herzegovina.
Honduras.
Iceland.
India. British.
Italy.
Jaffa, Turkey.
Japan.
Java.
Jask, Persia.
Jerusalem, Turkey.
Kerassunde, Turkey.
Kilwa, Africa.
Klein-Popo, or Little Popo, Togo, Africa.
Lagos, Africa.
Labuan, Borneo.
Lamu, Africa.
Lindi, East Africa.
Linga, or Lingor. Persia.
Little Popo, or Klein-Popo, Togo, Africa.
Lome, Togo, Africa.
Luxemburg, Grand Duchy.
Madeira Islands.
Madura, Dutch East Indies.
Malacca, Straits Settlements.
Malta.
Massowah, Africa
Matadi, Congo Free State.
Mauritius.
Mitylene, Turkey.
Molucca Islands.
Mombasa, Africa.
Muscat, Arabia.
Natal, South Africa.
Netherlands.
Norway.
Pangani, Africa.
Penang, Straits Settlements.
Persia.
Portugal.
Previsa, Turkey.
Retimo, Crete, if drawn as an Austrian order.
Rhodes, Turkey.
Roumania.
Saadani, East Africa.
Saint Helena.
Salonica, Turkey. if drawn as British or Austrian.
Salt Pond, Gold Coast.
Salvador, Central America.
Samsun, Turkey
Santi, Quaranta, Turkey.
Scio, Chios, Turkey.
Servia.
Seychelle Islands.
Siam.
Sierra Leone, Africa.
Singapore, Straits Settlements.
Smyrna, Turkey, if drawn as Austrian.
Straits Settlements.
Sweden.
Switzerland.
Sumatra.
Tanga, Africa.
Tangier, Morocco, if drawn as British.
Trebizond, Turkey.
Turk's Island, West Indies.
Valona, Turkey.
Victoria, Cameroons, Africa.
West Coast of Africa.
Western Australia.
Zanzibar, Africa, if drawn as a British order.

* N. B.—Money orders intended for payment to persons residing in Egypt should now be drawn as Egyptian, not as British or French.

RATES OF POSTAGE TO FOREIGN COUNTRIES.

UNIVERSAL POSTAL UNION.

Treated concluded at Vienna, Austria, July 4, 1891.

		Cts.
Letters, per 15 grams or ½ ounce		5
Postal Cards, each		2
Postal Cards, with paid reply, each		4
Commercial Papers,	First 10 ounces or fraction thereof	5
	Every additional 2 ounces	1
Samples of Merchandise,	First 4 ounces	2
	Every additional 2 ounces	1
Registration Fee on letters or other articles		8

All correspondence other than letters must be prepaid at least partially.

COUNTRIES OR PLACES WHICH, WITH THE UNITED STATES, ARE COMPRISED IN THE UNIVERSAL POSTAL UNION, AND TO WHICH THE ABOVE RATES APPLY.

FOREIGN MAILS.

NOTE 4.—Countries and colonies of the Universal Postal Union other than the United States: ARGENTINE REPUBLIC, including eastern parts of Patagonia and Terra del Fuego and Staten Island.

Ascension—Island of (British Colony).

AUSTRIA-HUNGARY, including the Principality of Lichtenstein.

AUSTRALIA.—See the separate colonies in their alphabetical order.

BAHAMAS.

BARBADOS, W. I.

BELGIUM.

BERMUDAS.

BOLIVIA.

BOSNIA-HERZEGOVINA.

BRAZIL.

BRITISH COLONIES on West coast of Africa (Gold Coast, Lagos, Senegambia and Sierra Leone).

BRITISH COLONIES IN WEST INDIES, viz.: Antigua, Dominica, Montserrat, Nevis, St. Christopher, the Virgin Isles, Grenada, St. Lucia, Tobago and Turk's Islands.

BRITISH GUIANA.

BRITISH HONDURAS.

BRITISH INDIA: Hindostan and British Burmah (Aracan, Pegu, and Tenasserim), and the Indian Postal Establishments of Aden, Muscat, Persian Gulf, Guadur, Mandalay.

BULGARIA, Principality of.

CANADA.

CEYLON.

CHILE, including western parts of Patagonia and Terra del Fuego.

COLOMBIA, Republic of.

Colony of the Cape of Good Hope, including Basutoland, Griqualand, Little Namaqualand, Pondoland, Tembuland, Transkei, Walfish Bay, and Bechuanaland.

Congo, Independent State of.

Costa Rica.

Cyprus, Island of.

Danish Colonies of St. Thomas, St. Croix and St. John.

Denmark, including Iceland and the Faroe Islands.

Dominican Republic.

East Africa, British Protectorate of.

Ecuador.

Egypt.

Falkland Islands.

Fiji Islands, Colony of.

France, including Algeria, the Principality of Monaco, and French post office establishments in Morocco, at Shanghai (China), and in Zanzibar, Cambodia, Annam and Tonquin.

French Colonies;

1. *In Asia:* French establishments in India (Chandernagare, Karikal, Mahé, Pondicherry, Yanaon); and in Cochin China (Saigon, Mytho, Bien-Hoa, Poulo-Condor, Vinghi Long, Hatien, Tschandok).
2. *In Africa:* Senegal and dependencies (Goré, St. Louis, Bakel, Dagana); Mayotte and Nossi-be, French Congo-Gaboon (including Grand Bassam and Assinie); Reunion (Bourbon); Madagascar; and Obock on the east coast.
3. *In America:* French Guiana, Guadeloupe and dependencies (Désirade or Deseada, Les Saintes, Marie Galante, and the north portion of St. Martin), Martinique, St. Bartholomew, St. Pierre and Miquelon.
4. *In Oceanica:* New Caledonia, Tahiti, Marquesas Islands, Isle of Pines, Loyalty Islands, the Archipelagoes of Gambier Toubouai, and Tuamotou (Low Islands).

Germany, including the Island of Heligoland and the German post office at Apia (Samoan Islands), and at Shanghai (China).

German Protectorates:

Territory of Cameroons (or Kameroun) West coast of Africa); Territory of the New Guinea Company (in Papua); Territory of South West Africa (Grand Namaqua, the Damaras Country, and the southern portion of Ovambo, between Cape Colony and Angola): Territory of Togo (Western Africa); Territory of East Africa; the Marshall Islands, in the Pacific Ocean.

Gibraltar, and its Postal Agencies in Morooco.

Great Britain and Ireland.

Greece, including the Ionian Isles.

Greenland.

GUATEMALA.

HAITI.

HAWAII.

HONDURAS, Republic of, including Bay Islands.

HONG-KONG and the post office maintained by Hong-Kong at Klung-Chow, Canton, Swatow, Amoy, Foo-Chow, Ning-po, Shanghai and Hankow (China).

ITALY, including the Republic of San Marino, the Italian offices of Tunis and Tripoli in Barbary; Massonah, Assab, Asmara and Keren (in the Italian Colony of Eritrea—Abyssinia).

JAMAICA.

JAPAN, including Formosa, and Japanese post offices at Shanghai (China), and Fusam-po, Genzanshin and Jinsen (Corea).

LABUAN.

LIBERIA,

LUXEMBURG.

MALTA and its dependencies, viz.: Gozzo, Comino and Cominoto).

MAURITIUS and dependencies (the Amirante Islands, the Seychelles and Rodrigues).

MEXICO.

MONTENEGRO.

NATAL, Colony of, including Zululand.

NETHERLANDS.

NETHERLANDS COLONIES:

1. *In Asia:* Borneo, Sumatra, Java (Batavia), Billiton, Celebes, (Macassar). Madura, the Archipelagoes of Banca and Rhio (Riouw), Bali, Lombok, Sumbawa, Flores, the S. W. portion of Timor and the Moluccas.
2. *In Oceanica:* The N. W. portion of New Guinea (Papua).
3. *In America:* Netherlands Guiana (Surinam), Curacao, Aruba, Bonaire, part of St. Martin, St. Eustatius and Saba.

NEWFOUNDLAND.

NEW GUINEA, British Colony of.

NEW SOUTH WALES, Colony of, including Lord Howe Island and the Norfolk Islands.

NEW ZEALAND, Colony of, including Chatham Island.

NICARAGUA.

NORTH BORNEO, British Colony of.

NORWAY.

THE ORANGE FREE STATE.

PARAGUAY.

PERSIA.

PERU.

PORTUGAL, including the Island of Madeira and the Azores.

PORTUGUESE COLONIES:

1. *In Asia:* Goa, Damao, Diu, Macao, and parts of Timor.

2. *In Africa:* Cape Verde, Bissao, Cacheo, Islands of St. Thomé and Princes, Ajuda, Mozambique, and the province of Angola.

QUEENSLAND, Colony of.

ROUMANIA (Moldavia and Wallachia).

RUSSIA, including the Grand Duchy of Finland.

SALVADOR.

SAMOAN (NAVIGATORS) ISLANDS, German post office at Apia.

SARAWAK—British Protectorate of.

SERVIA.

SIAM.

SOUTH AFRICAN REPUBLIC (The Transvaal).

SPAIN, including the Balearic Isles, the Canary Islands, the Spanish possessions on the north coast of Africa (Ceuta, Penon de la Gomera, Alhucemas, Melilla, and the Chaffarine Islands), the Republic of Andorro, and the postal establishments of Spain on the west coast of Morocco (Tangier, Tetuan, Larrache, Rabat, Mazagan, Casablanca, Saffi, and Mogador).

SPANISH COLONIES:

1. *In Africa:* Islands of Fernando Po, Annobon, and Corisco.
2. *In America:* Cuba and Puerto Rico.
3. *In Oceanica:* The Archipelagoes of the Mariana (Ladrone) and the Caroline Islands.
4. *In Asia:* The Philippine Archipelago (Luzon, with Manila, Mindanao, Palawan, Pemay, Amar, etc.), and its dependencies Soulou, Marianna, Caroline, Palaos or Pelew Islands.

STRAITS SETTLEMENTS (Singapore, Penang, and Malacca).

ST. HELENA—Island of (British Colony).

ST. VINCENT, W. I.

SOUTH AUSTRALIA, Colony of.

SWEDEN.

SWITZERLAND.

TASMANIA, Colony of.

TRINIDAD, W. I.

TUNIS, Regency of.

TURKEY (European and Asiatic).

URUGUAY.

VENEZUELA.

VICTORIA, Colony of.

WEST AUSTRALIA, Colony of.

ZANZIBAR, British Protectorate of.

FOREIGN POSTAGE TABLE.

SHOWING THE RATES OF POSTAGE CHARGEABLE IN THE UNITED STATES ON MAIL MATTER FOR FOREIGN COUNTRIES.

b. Articles destined for places marked "*b*" cannot be sent under registration *through to destination.*

c. Prepayment of postage on ordinary letters is optional *with senders.* Full prepayment is required upon *all registered articles ;* and postage upon all articles other than letters is required to be prepaid, at least in part. If the postage is not prepaid *in full, double* the amount of the deficiency will be collected of the addressee when the article is delivered.

d. On articles for places marked "*d*" additional postage may be collected on delivery ; the rates stated in this Table being fixed to cover the postage charges to the port of debarkation only.

e. For the rates and conditions applicable to articles sent by "Parcels-Post" to certain foreign countries see the heading "*Parcels-Post.*"

Countries or Places of Destination.	Letters per 15 Grams. or ½ oz.	Postcards. Single, each.	Postcards. With Paid Reply, each.	Registration Free,	Printed Matter of All Kinds per 2 oz.	Commercial Papers per 2 ozs.	Samples of Merchandise per 2 ozs.
1.	2.	3.	4.	5.	6.	7.	8.
All of the Countries and Colonies of the Universal Postal Union, except Canada and Mexico.—See Note 4.	Cents. 5.	Cents. 2.	Cents. 4.	Cents. 8.	Cents. 1.	The same as for "printed matter," except that the lowest charge on any package, whatever its weight, is 5 cents.	The same as for "printed matter," except that the lowest charge on any package, whatever its weight, is 2 cents.
Canada.—See Note H. At least one single rate of postage (two cents) must be prepaid on ordinary letters. Plants and seeds are subject to the rate of one cent per ounce. "Printed matter" is subject to the domestic rates. Mexico.—See Note H. At least one rate of postage (two cents) must be prepaid on ordinary letters.	U. S. Domestic Rates.	U. S. Domestic Rates.	U. S. Domestic Rates.	U. S. Domestic Rates.	U. S. Domestic Rates.		
Countries and Colonies *Not* in the Universal Postal Union, Viz:							
AFRICA: (*b*) (*d*). Abyssinia.—Articles may be registered for delivery at Djibouti, Somali Coast. Bechuanaland Protectorate, including Kanye, Lake Nyassi, Macloutsie, Mashonaland, Matabeleland, Molepolole, Palachwe [Khamastown], Shoshong, Tati River, and Zambesi. British Central Africa, including British Nyasseland, Barotse, Lake Moero, Tanganyika, and upper Zambesi. Comoro Islands.—(Grand Comoro, Anjouan Mohele). Madagascar.—Native Possessions. Morocco, except European post offices.	5.	2.	4.	8.	1.		

FOREIGN POSTAGE TABLE.—*Continued.*

Countries and Colonies *Not* in the Universal Postal Union, Viz:	Letters per 15 Grams. or ½ oz.	Postcards. Single, each.	Postcards. With Paid Reply, each.	Registration Free,	Printed Matter of All Kinds per 2 Ozs.	Commercial Papers, per 2 Ozs.	Samples of Merchandise per 2 Ozs.
1.	2. Cents.	3. Cents.	4. Cents.	5. Cents.	6. Cents.	7.	8.
AFRICA: (*b*) (*d*)—*Continued.*							
Niger Coast Protectorate, including Benin, Bonny, Brass, Calabar [New and Old], Opobo, and Waree or Forcados. West Coast—Native Possessions.	5.	2.	4.	8.	1.	The same as for "printed matter," except that the lowest charge on any package, whatever its weight, is 5 cents.	The same as for "printed matter," except that the lowest charge on any package, whatever its weight, is 2 cents.
ASIA: (*b*) (*d*)							
Afghanistan. China. Korea. Sarawak. §Shanghai—U. S. Postal Agency at (*b*) (*d*).	5.	2.	4.	8.	1.		
OCEANICA: (*b*) (*d*)							
Cook Islands (Raratonga.) Friendly [Tonga] Islands. Navigators Islands, or Samoa. Pitcairn Island. Savage Islands. Society Islands. Other islands in the Southern Pacific Ocean.	5.	2.	4.	8.	1.		

§ Shanghai. Articles of every kind and nature which are admitted to the United States domestic mails are admitted to the mails exchanged between the United States and the United States Postal Agency at Shanghai, China; subject, however, to the following rates of postage, which must be prepaid, in all cases, by means of United States postage stamps on all articles, except official correspondence in "penalty" envelopes.

First-class matter, 5 cents for each ½ ounce or fraction of ½ ounce;

Postal cards, single, 2 cents each; double, 4 cents each;

Second and third-class matter, and samples of merchandise not exceeding 8 ounces in weight, 1 cent for each two ounces or fraction of 2 ounces

Fourth-class matter, 1 cent for each ounce or fraction of an ounce:

Packages of third and fourth-class matter (except single volumes of printed books) must not exceed four pounds (4 lbs.) in weight.

Registration fee, 8 cents; no additional charge for return receipt.

Articles other than letters *in their usual and ordinary form* must not be closed against inspection, but must be so wrapped or inclosed that they may be readily and thoroughly examined by postmasters and customs officers.

Articles addressed for delivery at the following places in China, viz:

Cheefoo (Yentai)	Hankow	Kaiping,	Nanking,	Ourga,	Taku,	Wuchang,
Chin Kiang,	Hung Chow	Kalgan,	Newchwang,	Peking,	Tientsin,	Wuhu,
Chung King,	Ichang,	Kiukiang,	Ningpo,	Shanghai,	Wenchow,	Yentai (Cheefoo).

are transmissable in the mails for the U. S. Postal Agency at Shanghai; but at places other than Shanghai, additional charges for postage may be collected of the addressees upon the delivery of the articles.

PARCELS POST.

STATEMENT SHOWING THE COUNTRIES TO WHICH PARCELS MAY BE SENT; THE DIMENSIONS, WEIGHT AND RATES OF POSTAGE APPLICABLE TO PARCELS, AND THE EXCHANGE POST OFFICES WHICH DISPATCH AND RECEIVE PARCELS POST MAILS.

Names of Countries.	Allowable Weight of Parcels.				Postage.		Exchange Post Offices.	
	Greatest Length.	Greatest Length and Girth Combined.	Greatest Girth.	Greatest Weight—Pounds.	For a Parcel not exceeding 1 Pound.	For every additional Pound or fraction of a Pound.	United States.	Foreign.
Bahamas	3 feet 6 inches.	6 feet.	......	11	12 cts.	12 cts.	New York.	Nassau.
Barbadoes	3 " 6 "	6 "	......	11	12 "	12 "	"	Bridgetown.
Colombia	2 "	......	4 feet.	11	12 "	12 "	All offices authorized to exchange mails between the two countries.	
Costa Rica	2 "	......	4 "	11	12 "	12 "		
The Danish West Indies	3 " 6 "	6 feet.	......	11	12 "	12 "		
Hawaii	3 " 6 "	6 "	......	11	12 "	12 "	San Francisco.	Honolulu.
Honduras (British)	3 " 6 "	6 "	......	11	12 "	12 "	New Orleans.	Belize.
Honduras (Republic)	3 " 6 "	6 "	......	11	12 "	12 "	New York, New Orleans and San Francisco.	
Jamaica (inc. Turks and Caicos Islands.)	3 " 6 "	6 "	......	11	12 "	12 "	New York.	Kingston.
Leeward Islands	3 "	6 "	......	11	12 "	12 "	"	St. John, Antigua.
Mexico	2 " 6 "	......	4 feet.	11	12 "	12 "	All offices authorized to exchange mails between the two countries.	
Salvador	3 " 6 "	6 feet.	......	11	12 "	12 "		
Guiana (British)	3 " 6 "	6	......	11	12 "	12 "		
Windward Islands	3 " 6 "	6	......	11	12 "	12 "		
Newfoundland	3 " 6 "	6 "	......	11	12 "	12 "	New York, Philadelphia.	St. John's, N. F.

AMERICAN PHOTOGRAPHIC SOCIETIES.

AGASSIZ ASSOCIATION, MANHATTAN CHAPTER.—141 East 40th Street, N.Y.C. Organized 1881. *President*, C. F. Groth; *Vice-President*, C. Kromm; *Board of Trustees*, C. F. Groth, C. Miller, E. B. Miller, W. S. Miller, H. T. Rowley, F. Fruhan, H. Breunich, Miss Lieson, Miss Hargrove; *Treasurer*, W. S. Miller, *Corresponding Secretary*, E. B. Miller, 141 E. 40th Street. Place of meeting, 141 East 40th Street. Ordinary meetings, first Friday after first Monday each month. Annual meeting, first meeting of year. Membership September 1: Active, 28.

ALBANY CAMERA CLUB.—72 Chapel Street, Albany, N. Y. Organized 1884. *President*, W. W. Byington; *Vice-President*, Dr. Samuel B. Ward; *Directors*, C. W. Reynolds, J. S. Paterson, Geo. H. Russell, H. P. Moore, R. S. Oliver, L. H. Stewart, Dr. L. H. Neuman, B. W. Arnold; *Treasurer*, Dr. F. W. Cady; *Librarian*, Dr. T. L. Carroll; *Secretary*, Chas. B. Tillinghast, 72 Chapel Street. Place of meeting, 72 Chapel Street. Ordinary meetings first Friday in each month. Special meetings on call. Annual meeting first Friday in April. Membership September 1: Honorary, 1; active, 60; associate, 67; non-resident, 18; total, 138. Exhibitions (print) annually as arranged.

AMATEUR PHOTOGRAPHIC ASSOCIATION.—Selma, Dallas Co., Alabama. Organized December 29, 1887. *President*, William S. Monk; *Executive Committee*, S. A. Sexton, Miss Mary E. Keipp; *Treasurer*, S. Orlando Trippe, Selma, Dallas Co., Alabama. Place of meeting, 916 Broad Street. Special meetings, first Tuesday each month. Annual meeting, first Tuesday in January. Membership, September 1, active, 32.

AMERICAN LANTERN SLIDE INTERCHANGE.—Organized 1885. *President General Manager*, F. C. Beach; *Board of Managers*, F. C. Beach, W. H. Cheney, W. H. Rau, George Timmins, John S. Paterson. Annual meeting, November 15 each year. Membership September 1, consisted of twenty-eight clubs and societies as follows: Camera Club, of New York, Photographic Society, of Philadelphia, Newark (N. J.) Camera Club, Orange Camera Club, Frankford (Pa.) Camera Club, Bethlehem Photographic Society, St. Louis Photographic Society, California Camera Club, (San Francisco, Cal.), Oregon Camera Club, (Portland, Oregon), Minneapolis Camera Club, Rockford (Ill.) Camera Club, Chicago Society of Amateur Photographers, Buffalo Camera Club, Syracuse Camera Club, Albany Camera Club, New Britain Camera Club, Toronto Camera Club, Montreal Camera Club, Hamilton Association Camera Club, Topeka Camera Club, Sacramento Camera Club, Redlands (California) Camera Club, Rutland Camera Club, Colorado Camera Club, (Denver), Department Photography Brooklyn Institute, St. Catherine's Camera Club, Ottawa Camera Club, Lancaster (Pa) Camera Club.

AMERICAN INSTITUTE (PHOTOGRAPHICAL SECTION).—111, 113, 115 West 38th Street, New York City. Organized 1859. *President*, Oscar G. Mason; *Vice-President*, Robert A. B. Dayton; *Treasurer*, William H. Oakley; *Secretary*, J. W. Bartlett, M. D., 149 West 94th Street. Place of meeting 111, 113, 115 West 38th Street. Ordinary meetings first Tuesday in each month. Annual meeting first Thursday in February.

ATLANTIC CITY PHOTOGRAPHIC SOCIETY.—1,000 Atlantic Avenue, Atlantic City, N. J. Organized, November 10, 1895. *President*, Herbert N. Morse; *Vice-President*, Fred. Stadler, Jr.; *Treasurer*, L. D. Algar; *Secretary*, Hubert Somers, 1816 Arctic Avenue; *Executive Committee*, Herbert N. Morse, Fred. Stadler, Jr., L. D. Algar, Hubert Somers, H. P. Miller and Miss Lou Ina Evans. Meetings on the first Monday of each month and special meetings at the call of the President. Annual meeting, the first Monday in February each year. Give three public slide exhibitions each year, three prints contests for gold medals each year among the members, and numerous lectures on photographic work and slides for members. Membership 58.

BETHLEHEM PHOTOGRAPHIC SOCIETY.—Bethlehem, Penn. Organized 1893. *President*, James E. Tatnall; *Vice-President*, J. Taylor Hamilton; *Executive Committee*, Officers of the Society; *Treasurer*, Eugene A. Rau; *Secretary*, R. Paul Stout, Market Street, Bethlehem, Pa. Place of meeting, at homes of members. Ordinary meetings, monthly. Membership September 1: Honorary, 2; active, 12; Total, 14.

BOSTON CAMERA CLUB.—50 Bromfield St., Boston, Mass. Organized 1881. *President*, Joseph Prince Loud; *Vice-Presidents*, William O. Witherell, Charles H. Currier, Charles Sprague; *Executive Committee*, Officers and R. A. Bullock, F. H. Manning, T. J. Babcock, F. S. Harlow, F. S. Arable, E. R. Andrews; *Treasurer*, Charles H. Chandler; *Librarian*, G. Francis Topliff; *Secretary*, Chas. Hall Perry, 50 Bromfield St., Boston. Place of meeting, Club rooms. Ordinary meetings, first Monday evening at 8 o'clock in each month, except July, August, and September. Special meetings as called. Annual meeting, first Monday in January. Membership September 1: Honorary, 9; active, 90; associate, 9; total, 108. Exhibitions, the annual exhibition in April. Other exhibitions frequently.

BRIDGETON CAMERA SOCIETY.—Bridgeton, N. J. Organized January 29, 1890. *President*, Henry W. Scull; *Vice-President*, Sidney H. Ogden; *Executive Committee*, E. B. Garrison, F. E. Riley, Chas. C. Woodruff; *Treasurer*, Hugh L. Reeves; *Secretary*, Geo. Hampton, Bridgeton, N. J. Place of meeting, rooms of the Society. Ordinary meetings, first Tuesday each month. Annual meeting, first Tuesday in February. Membership September 1: Active, 38. Exhibitions annually.

BROOKLYN ACADEMY OF PHOTOGRAPHY.—177 Montague Street, Brooklyn, N. Y. Organized, Incorporated February 1887. *President*, H. B. Fullerton; *First Vice-President*, Samuel Baron; *Second Vice-President*, F. M. Lawrence; *Board of Trustees*, H. B. Fullerton, Samuel Baron, F. M. Lawrence, Wm. T. Wintringham, Sherman Esselstyn, W. B. Dudley, Wm. Arnold, Frank La Manna, Augustus A. Goubert, John Merritt, M.D., Starks W. Lewis, S. B. Price, M.D.; *Treasurer*, Wm. T. Wintringham; *Librarian*, Sherman Esselstyn; *Corresponding Secretary*, Wm. B. Dudley, *Recording Secretary*, Wm. Arnold, 177 Montague Street, Brooklyn, N.Y. Place of meeting, 177 Montague Street, Brooklyn. Ordinary meetings, first Tuesday (not a holiday) in each month, 8 P. M. Special meetings on call of chair, or on written request of five members. Annual meeting, first Tuesday in June. Membership September 1: Honorary, 5; active, 65; corresponding, 12; total, 82. Exhibitions: Competitive exhibition of prints and lantern slides every Spring.

BUFFALO CAMERA CLUB.—The Palace Arcade Building, 617 Main Street. Organized October 1, 1888. *President*, John A. Stein; *Vice-President*, Rev. C. E. Rhodes; *Board of Directors*, John A. Stein, Rev. C. E. Rhodes, Conrad L. Baer, Thad W. Gardiner, John P. Zenner, Harlow H. Boyce, H. H. Guenther, H. W. Saunders, William G. Houck, Philip J. Knapp and George J. Bailey; *Treasurer*, Conrad L. Baer; *Exhibition Manager*, John P. Zenner; *Secretary*, Thad W. Gardiner, 444 Herkimer Street, Buffalo, N. Y. Place of meeting Palace Arcade Building. Ordinary meetings, Directors' meeting on fourth Friday evening of each month at 8.15 o'clock. Annual meeting fourth Tuesday evening in September, at 8.15 o'clock. Membership September 1: honorary 3; active 107; total 110. Exhibitions, lantern slide exhibitions held fortnightly, during winter season, at club rooms. Member American Lantern Slide Interchange.

CALIFORNIA CAMERA CLUB.—819 Market Street, S. F., Cal. Incorporated April 5, 1890. *President*, J. W. Erwin; *First Vice-President*, W. E. Goodrum; *Second Vice President*, E. J. Dollard; *Directors*, W. J. Street, W. B. Webster, H. A. Sully, H. B. Madison; *Treasurer*, E. G. Eisen; *Librarian*, J. J. B. Argenti; *Secretary*, H. B. Hosmer, 819 Market Street, San Francisco, Cal. Place of meeting, Club Rooms. Special meetings at call of President. Annual meeting, first Tuesday after first Monday in April. Membership September 1: Honorary 5; active, 142; corresponding, 8; associate, 8; subscribing, 120; total, 283. Exhibitions monthly.

CAMERA CLUB, N. Y., THE.—3 West 29th Street, New York, N. Y. Organized 1896. *President*, Wm. D. Murphy; *Vice-President*, Alfred Stieglitz; *Board of Trustees*, Louis B. Schram, Wm. R. Thomas, Wm. Bunker, John Beeby, James T. Vredenburgh, D.D.S.; *Treasurer*, Frank M. Hale; *Librarian*, John Beeby; *Publication Committee*, Alfred Stieglitz, Wm. M. Murray, Jos. Obermeyer; *Secretary*, Harry B. Reid. Place of meeting, 3 West 29th Street, N.Y. Ordinary meetings, every second Tuesday in every month, except July and August, 8.30 P.M. Special meetings, every Wednesday evening, lantern slide tests with criticisms. Annual meeting, second Tuesday in April, 8.30 P.M. Membership September 1: Honorary, 16; active, 185; corresponding, 18; non-resident, 50; total, 269. Publications, Camera Notes. Exhibitions of prints by prominent photographers monthly for ensuing year.

"CAMERADS"—New Brunswick, N. J. *President*, Prof. P. T. Austen; *Secretary*, Dr. H. Iredell, Lock Box 34, New Brunswick, N. J. Place of meeting, Rutgers College.

CAPITOL CAMERA CLUB.—Washington, D. C. Organized May 1, 1891. *President*, George W. White; *Vice-President*, Wallace C. Babcock; *Board of Directors*, George W. White, Wallace C. Babcock, William P. Herbst, Charles E. Fairman, W. F.

Peabody, Dr. Robert Reyburn, A. J. Le Breton, William D. Searle, E. M. Tolman, Rev. Leslie Moore, Rev. L. G. Wood, Miss Kate S. Curry; *Treasurer*, William P. Herbst; *Librarian*, W. F. Peabody; *Secretary*, Charles E. Fairman, 511 11th Street, N. W. Place of meeting Club rooms, 1010 F Street, N. W. Ordinary meetings first Saturday in each month at 8 P.M. Annual meeting first Saturday in May. Membership September 1: honorary, 7; active, 95; total, 102. Exhibitions, annual exhibition of prints in April.

CHICAGO CENTRAL Y. M. C. A. CAMERA CLUB.—153 La Salle Street. Organized 1896. Membership July 1, 1898, 61. *President*, Dr. A. K. Crawford; *Vice-Presidents*, W. T. Hart and W. T. Galloway; *Treasurer*, Dr. G. G. Burdick. *Secretary*, F. C. Hersey, Jr., 153 La Salle Street. Annual meeting March; Exhibition in Fall. Lectures throughout year.

CHICAGO SOCIETY OF AMATEUR PHOTOGRAPHERS.—*President*, Marshall Wait; *Vice-President*, W. A. Bosley; *Treasurer*, Frank W. Smith; *Librarian*, F. F. Gaylord; *Secretary*, F. F. Gaylord. Place of meeting, the Art Institute. Ordinary meetings, second and fourth Wednesdays of each month, except July and August. Special Meetings, Friday evenings, "Work Nights," first Monday evening each month, Ladies' "Work Night." Annual meeting, second Wednesday January. Membership, September 1: Honorary, 8, active, 59; total, 67. Exhibitions: 1—Annual Lantern Slide Exhibition for Public, no date fixed. 2—Semiannual Print Exhibits, no date set.

COLORADO CAMERA CLUB ASSOCIATION.—329 16th Street, Denver, Colorado. Organized October 1891. *President*, W. H. Jackson; *Vice-President*, Major William Cooke Daniels; *Board of Directors*, W. H. Jackson, H. D. Smith, Major William Cooke Daniels, A. B. Daniels, Robert J. Coleman, A. D. Gilleland, S. C. McCurdy; *Treasurer*, H. D. Smith; *Librarian*, Robert J. Coleman; *Secretary*, A. D. Gilleland, 329 16th Street, Denver, Colorado. Place of meeting 329 16th Street. Ordinary meetings third Wednesday of each month. Special meetings called by the President. Annual meeting third Saturday in December. Membership September 1: honorary, 2; active, 60; associate, 78; total, 140. Exhibitions latter part of November each year. Lantern Slides from the American Lantern Slide Interchange.

COLUMBIA PHOTOGRAPHIC SOCIETY.—1811 N. Broad Street, Philadelphia, Pa. Organized December 7th, 1889. Incorporated June 29th, 1894. *President*, Dr. G. J. R. Miller; *Vice Presidents*, 1st, P. A. Mitchell; 2nd. Frank F. Gartley, Esq.; *Board of Directors*, Wm. W. Chambers, J. Henry Pepper, N. E. Roedel, S. Morris Scattergood, J. Wesley Allison, Louis Renner, A. R. Heinitsch; *Treasurer*, John S. Newman; *Secretary*, John Curtis, Sr., 1811 N. Broad Street, Philadelphia, Pa. Place of meeting, 1811 N. Broad St. Stated meetings, first Monday in each month, (society meetings), 8 P.M. Regular meetings, second and fourth Mondays in each month, excepting July and August (for demonstrations, discussions, etc.), 8 P.M. Annual meeting, first Monday in February, 8 P.M. Membership September 1: Honorary, 3; active, 121; corresponding, 7; total, 131. Publications, "The Camera," (monthly). Exhibitions are arranged for during each Winter month, also prize contests.

COLUMBIAN AMATEUR PHOTO EXCHANGE.—Organized 1893. *President*, A. H. Waite; *Treasurer* and *Secretary*, W. E. Dickinson; Bradford, Iowa. Membership limited to 15. Exchanges prints quarterly.

CORLISS ART AND CAMERA CLUB.—Newburyport, Mass. *President*, John H. Wheeler; *Vice-President*, F. Nicklas; *Treasurer and Secretary*, Edgar F. Noyes; *Corresponding Secretary*, Otis P. Gould. Place of meeting, Y.M.C.A. building. Ordinary meetings, first Friday of each month. Special meetings called by President at request of three members. Annual meeting first Friday in April. Membership September 1: Honorary, 3; active, 35; total, 38. Exhibitions: An annual exhibition is held every February.

CORTLAND CAMERA CLUB.—Organized 1896. *President*, Jno. W. Orr; *Vice-President*, C. C. Darby; *Treasurer* and *Secretary*, L. M. Alexander, Lock box 213, Cortland, N. Y. Place of meeting, Y.M.C.A. Ordinary meetings first Wednesday each month at 8 o'clock. Annual meeting, first Wednesday in November, Membership September 1: Active, 15.

DETROIT CAMERA CLUB.—Detroit, Mich. Organized February 11, 1897. *President*, E. Donald Roberts; *Vice-President*, Mrs. Geo. O. Pratt; *Executive Committee*, E. Donald Roberts, Geo. O. Pratt, Mrs. Geo. O. Pratt, Major O'Brien Atkinson, A. D. Noble, Jr., and F. B. Wood; *Treasurer*, Geo. O. Pratt; *Custodian*, A. D. Noble, Jr., *Historian*, Mrs. Janet Sherman; *Secretary*, Geo. O. Pratt, 720 Antoine Street, Detroit. Place of meeting, Detroit Museum of Art. Ordinary meetings every second Tuesday. Special meetings whenever called by President. Annual meeting, January. Membership September 1: Honorary, 3; active, 89; total, 92. Exhibitions, Club exhibit in Spring. International Salon and Exhibition in Fall.

ELIZABETH CAMERA CLUB.—96 Broad Street, Elizabeth, N. J. Organized, May, 1893. *President*, D. R. Blackford; *Vice-President*, H. O. Halsey; *Executive Committee*, Dr. E. D. Frost, J. G. Green, W. R. Bird, H. O. Halsey, J. A. Knowles, Geo. Cosmus, D. H. MacFarland; *Treasurer*, James A. Knowles; *Librarian*, W. R. Bird; *Secretary*, E. R. French. Place of meeting, 96 Broad Street. Ordinary meetings, first Saturday each month, 8.15 P.M. Annual meeting, first Saturday in May. Membership September 1: Active, 26; corresponding, 1; total, 27. Exhibitions at different times during the year. Notice given.

FRANKFORD CAMERA CLUB.—(Photographic Section Wright's Industrial and Beneficial Institute, Frankford, Philadelphia, Pa.). Organized October, 1888. *President*, B. Antrim Haldeman; *Vice-President*, Jno B. Lomar; *Executive Committee*, B. S. Thorp, H. T. Crankshaw, Jno. B. Lomar, Miss M. C. Shallcross, Miss M. W. Rorer, and *ex-officio* the President and Secretary; *Treasurer*, Harry T. Crankshaw; *Secretary*, John M. Justice, 5016 Penn St., Frankford, Philadelphia. Place of meeting, Club Rooms, Wright's Institute, Franklin and Unity Sts. Regular meetings, second Friday, conversational meetings, fourth Friday, in each month. Special meetings at call of President. Annual meeting, second Friday in April. Membership September 1: Honorary, 2; active, 99; contributing, 3; corresponding, 6; total, 110. Exhibitions annual, second Thursday in November, others as Executive Committee may arrange for.

INTERNATIONAL PHOTO PRINT EXCHANGE.—Organized, May, 1893. A postal photo Exchange Club. *Secretary*, Walter Sprange, Beach Bluff, Mass. Membership September 1: Active, 20.

LANCASTER CAMERA CLUB.—Organized, May 15, 1895. *President*, W. S. Gleim; *Vice-President*, W. A. Heitshu; *Treasurer* and *Recording Secretary*, Chas. A. Sauber; *Corresponding Secretary*, F. A. Demuth, 114 E. King Street, Lancaster, Pa. *Librarian*, G. Howard Werntz. Place of meeting, corner N Queen and E. Orange Streets, third floor. Ordinary meetings, first and second Fridays of each month, from September to June inclusive. Special meetings, at call of the President, or five members. Annual meeting, first Friday in May. Membership September 1: Honorary, 4; active, 15; total, 19. Exhibitions, annual lantern slide in month of March, Orange Street Opera House, work of members only. Admission by card from member. Members of American Lantern Slide Interchange.

LAWRENCE CAMERA CLUB.—Lawrence, Mass. Organized, February 28, 1898. *President*, Mr. Lester Prescott; *Vice-President*, Mr. John H. Greer; *Directors*, Messrs. Prescott, Greer, Ball, Dyer, and Morgan; *Treasurer*, Elbert H. Dyer; *Auditor*, Mr. Albert Morgan; *Secretary*, J. Rodney Ball, 232 Bruce Street, Lawrence, Mass. Place of meeting, Trinity Chapel, Lawrence. Ordinary meetings, second Monday evening in each month at 7.45 o'clock. Annual meeting, second Monday in March. Membership, September 1: Active, 10; total, 10.

LOWELL CAMERA CLUB.—Lowell, Mass. Organized 1889. Incorporated 1892. *President*, William P. Atwood; *Vice-President*, Frederick T. Walsh; *Executive Committee*, Charles Runels, Oliver H. Perry, Fay H. Martin; *Treasurer*, M. A. Taylor; *Librarian*, A. H. Sanborn; *Secretary*, George A. Nelson, 305 Sumner St., Lowell, Mass. Place of meeting, Central Block. Ordinary meetings at call of President. Speeial meetings at call of President. Annual meeting first Tuesday in March. Membership September 1: Active, 21.

MATTAPAN CAMERA CLUB.—Organized May 1890, *President*, John A. Locklin; *Vice-President* and *Treasurer*, Walter Hertzberg; *Librarian* and *Secretary*, Erdmann Sonnenbrodt, Box 83, Mattapan, Mass. Place of meetings, private residences of members. Ordinary meetings, Sundays. Special meetings, when called for by the President Annual meeting, May. Membership September 1: Active, 12. Exhibitions: Lantern slide exhibitions during winter months at private residences of members or schools and churches.

MINNEAPOLIS CAMERA CLUB.—Minneapolis, Minn. Organized 1892. *President*, H. E. Murdock; *Vice-President*, W. H. McMullen; *Board of Directors*, President, Vice-President, Treasurer, Secretary, and C. A. McCollom, J. Dodge, F. M. Laraway, Geo. W. Beach, E. J. Kimball, A. S, Williams; *Treasurer*, J. F. Schlimme; *Secretary*, C. J. Hibbard, 317 Hennepin Avenue, Minneapolis, Minn. Ordinary meetings, second and fourth Wednesday evenings of each month from September to June. Special meetings at call of President. Annual meeting, regular April meeting. Membership September 1: Honorary, 2; active, 22; associate, 12; total, 36.

MONTREAL CAMERA CLUB.—Club Rooms, No. 4 Phillips Square, Montreal. Organized September 1890. Incorporated May 1893. *President*, Frank R. Redpath; *Vice-President*, George Sumner; *Executive Committee*, Alfred W. Cole, J. L. Kerr, Robt. Turnbull, W. A. Scott, W. T. Marlatt, R. Wilson, Jr.; *Secretary-Treasurer*, A. C. Lyman, 157 St. James Street, Montreal. Place of meeting, Club Rooms, No. 4 Phillips Square. Ordinary meetings, every Tuesday evening from October till May, 8 P.M. Annual meeting, 1st Tuesday in May, 8 P.M. Membership September, 1: Active, 95. Exhibitions held annually, usually in March or April. It is proposed to alter dates to December in each year.

MYSTIC CAMERA CLUB.—Medford, Mass. Organized, June 4, 1889. *President*, Will. C. Eddy; *Vice-President*, L. E. Shattuck; *Executive Board*, Will C. Eddy, L. E. Shattuck, Geo. W. Prowse, Chas. A. Clark, Everett Scammon, Chas. A. Smith, Edwin M. Start; *Treasurer*, Chas. A. Clark; *Secretary*, Geo. W. Prowse, 20 Brookings Street, Medford, Mass. Place of meeting, 2 Ashland Street. Ordinary meetings, first and third Tuesdays of each month, 8.15 P. M. Special meetings at call of Executive Board. Annual Meeting, first Tuesday in January. Membership, September 1: Honorary, 6; active, 26; Associate, 2; total, 34. Exhibitions, April 19th to 21st, inclusive, of each year.

NEWARK (DEL.) CAMERA CLUB.—Newark, Delaware. Organized 1893. *President*, F. D. Chester; *Vice-President*, G. H. Powell; *Treasurer* and *Secretary*, F. W. Curtis, Newark, Delaware. Place of meeting, Club rooms. Annual meeting May 1. Membership September 1: Active, 10.

NORWALK CAMERA CLUB.—South Norwalk, Conn. Organized November, 1897. *President*, Mrs. V. D. Prentise-Lingan; *Vice-President*, David Disbrow; *Secretary* and *Treasurer*, Harry H. Finch, 13 Clay Street, South Norwalk, Conn. Regular meetings first Wednesday in the month. Special meetings at call of President. Annual meeting first Wednesday in November. Membership September 1: 22.

OLD COLONY CAMERA CLUB.—Rockland, Mass. Organized February 1, 1890. *President*, David Smith; *Vice-President* and *Treasurer*, Emery H. Jenkins; *Secretary*, David Smith, Rockland, Mass. Place of meeting, Arnold Building. Ordinary meetings at the call of the President. Membership September 1: Active, 12.

ONEIDA CAMERA CLUB.—Post Office Building. Organized March, 1884. *President*, Bradley Seymour Teale; *Vice-President*, George P. Hanson; *Executive Committee*, Jacob Standt, Wesley S. Fisher and Charles M. Kingsbury; *Treasurer*, Albert Dygert; *Secretary*, C. R. Baker. Place of meeting, Rooms, P. O. Building. Special meetings at call of President. Annual meeting, first Tuesday in March. Membership September 1: Honorary, 2, active, 30, total 32. Exhibitions, lantern slide exhibition in February.

ORANGE CAMERA CLUB, THE.—Orange, N. J. Organized March 20, 1892. *President*, Geo. E. Melendy; *Vice-President*, Geo. A. Van Wagenen, M.D.; *Executive Committee*, Composed of the officers and the Chairmen of the Finance, House, Library, Lantern Slide, and Membership Committees; *Treasurer*, David B. Plumb; *Secretary*, Frank N. Lord, Orange Camera Club, Orange, N. J. Place of meeting 222 Main Street, Orange, N. J. Ordinary meetings the 5th and 20th of every month. Annual meeting, 20th of March. Membership September 1: Honorary, 3; active, 71; total, 74. Exhibitions: Annual exhibition in November. The Interchange Slides as shown after each meeting. Test night for slides, the 12th of every month.

OREGON CAMERA CLUB.—Portland, Oregon. Organized January 14, 1895. *President*, Will. H. Walker; *Vice-President*, F. C. Cover; *Executive Committee*, Will H. Walker, F. C. Cover, Milton P. Goldsmith, F. A. French, Hugo S. Goldsmith; *Treasurer*, F. A. French; *Secretary*, Milton P. Goldsmith, P.O. box 93, Portland, Oregon. Place of meeting, rooms 214, 215, 216, and 217 Oregonian Building. Special meetings at call of President. Annual meeting first Tuesday in January, 8 P.M. Membership September 1: Active, 127. Exhibitions 1898. Print Exhibition, Oct. 8 to 15 inclusive. Lantern Slide Exhibitions monthly.

PHILADELPHIA, THE PHOTOGRAPHIC SOCIETY OF.—Philadelphia, Pa. Organized November, 1862. *President*, Robert S. Redfield; *Vice-Presidents*, George Vaux, Jr., and Walter P. Stokes; *Board of Directors*, John C. Browne, John G. Bullock, Jos. H. Burroughs, Samuel Castner, Jr., F. Wm. Geisse, Harold A. Freeman, Charles R. Pancoast, Wm. H. Rau, Wm. H. Roberts, Benj. Sharp, M.D., Henry Troth and Wm. S. Vaux, Jr.; *Treasurer*, Anthony W. Robinson: *Secretary*, Edmund Stirling, 4517 Kinsessing Ave., B. Place of meeting, 10 S. 18th St. Ordinary meetings, second Wednesdays, except in July, August, and September. Special meetings, first and fourth Wednesdays. Annual meeting, second Wednesday in April. Membership September 1: Active, 230. Exhibitions monthly at the Society's Rooms, Philadelphia Photographic Salon, Oct. 24th to Nov. 12th, 1898.

PHOTOGRAPHIC SECTION OF THE HAMILTON ASSOCIATION.—Public Library Building. *President*, J. M. Eastwood, Main Street, E.; *First Vice-President*, A. H. Baker, 5 James Street, N.; *Second Vice-President*, W. White, 9 James Street, N.; *Treasurer*, Geo. Lees, 5 James Street, N.; *Secretary*, W. H. Edwards, 168 Main Street, E., Hamilton, Ontario, Canada. Place of meeting, Hamilton Association Rooms, Public Library. Ordinary meetings, weekly throughout the winter. Regular business meeting on the last Tuesday of the month, 8 o'clock, P.M. Annual meeting, last Tuesday in April. Membership September 1: Honorary, 1; active, 66; total, 67. Exhibitions: Proposed exhibition of prints and lantern slides early in November, for Club members only.

PHOTOGRAPHIC CLUB OF BALTIMORE CITY, THE.—*President*, Dr. Frank Slothower; *Vice-President*, Percy M. Reese; *Directors, Council*, Dr Frank Slothower, Percy M. Reese, Chas. R. Dingle, A. S. Murray, J. T. Norris, E. M. Barker, F. W. McAllister; *Treasurer*, E. M. Barker; *Secretary*, Chas. R. Dingle, 703 N. Eutaw Street, corner Madison Street. Place of meeting, 703 N. Eutaw Street, corner Madison. Ordinary meetings first Tuesday in each month. Special meetings at call. Annual meeting first Tuesday in May. Exhibitions: Lectures with slides throughout the season.

PITTSFIELD CAMERA CLUB.—Pittsfield, Mass. Organized February 1, 1892. *President*, J. F. Middleton, 334 First Street; *Vice-President*, J. D. Roscoe, 141 North Street; *Executive Committee*, Messrs. J. F. Middleton, J. D. Roscoe, J. E. Colton, J. H. Musgrove, H. N. French, C. G. Tompkins, S. S. Stowell; *Treasurer*, J. H. Musgrove, 75 Maplewood Avenue; *Secretary*, Jos. E. Colton, 768 North Street. Place of meeting, 768 North Street. Ordinary meetings. second Wednesday of each month, at 8 o'clock. Special meetings called by the President. Annual meeting, second Wednesday in February. Membership September 1: Honorary, 1; active, 30; total, 31.

PITTSBURG AMATEUR PHOTOGRAPHERS' SOCIETY.—Organized, 1885. Incorporated, 1896. *President*, Mr. E. E. Keller; *Vice-President*. Mr. H. L. Christy; *Board of Trustees*, E. E. Keller, H. L. Christy, Mrs S. A. Ammon, A. B. McVay, W. S. Clow, W. J. Boston, W. J. Hunker, C. C. Craft, J. H. Hunter; *Treasurer*, Mr. W. J. Hunker; *Librarian*, Norman C. Davis; *Secretary*, Joseph H. Hunter, 520 Green Street, Pittsburg, Penn.; *Assistant Secretary*, Chas. C. McVay. Place of meeting, Pittsburg Carnegie Library. Ordinary meetings, second Monday of each month. Special meetings may be called at the discretion of the President, or on written request of five members. Annual meeting, second Monday in January. Membership September 1: Honorary, 2; active, 85; life, 1; total, 88. Exhibitions, Second Annual International Salon and Exhibition, will be held in The Carnegie Art Galleries, Pittsburg, from February 1st to February 20th, 1899.

POSTAL PHOTOGRAPHIC CLUB.—Organized, 1888. Officers, *President*, Albert J. L. Breton, Washington, D. C.; *Secretary and Treasurer*, F. O. Congdon, 120 Broadway, New York. Membership, 40. Object, the circulation of an album monthly, made up of contributions by the members, together with a note book for criticisms, etc.

PRATT INSTITUTE HIGH SCHOOL CAMERA CLUB.—Brooklyn, N. Y. Organized May 9. 1897. *President*, Irving Langmuir; *Vice-President and Secretary*, Robert L. Wood; *Treasurer*, H. P. Major; *Librarian*, W B. Bowie. Place of meeting, Room 21 Pratt Institute. Regular meetings monthly. Special meetings upon call of President. Membership October 1, 1898: active, 12. Exhibitions, annual, first week in June.

PROVIDENCE CAMERA CLUB.—87 Weybosset Street, Providence, R.I. Organized 1883. Incorporated 1889. *President*, Fred P. Wilbur; *Vice-President*, W. Penn Mather; *Executive Committee*, F. P. Wilbur, A. F. Manchester, J. E. Davison, E. A. Darling, R. C. Fuller, J. H. Tucker, S. B. Burnhame, C. A. Stoddard, F. E. Leonard; *Treasurer*, Edmund A. Darling; *Librarian*, D. Howard Thornton; *Recording Secretary*, Albert F. Manchester; *Corresponding Secretary*, J. E. Davison, Pawtucket, R.I. Place of meeting, 87 Weybosset St. Ordinary meetings, first Tuesday in each month. Special meetings, as called. Annual meeting, first Tuesday in June. Membership September 1: Honorary. 1, active, 83, associate, 13, total 97.

ROSE TECH. CAMERA CLUB.—Terre Haute, Ind. Organized March 1, 1898. *President*. A. D. Kidder; *Vice-President*, J. F. Schwed; *Executive Committee*, A. D. J. F. Schwed, H. A. Schwartz, O. E. McMeans; *Treasurer*, H. A. Schwartz; *Secretary*, H. A. Schwartz, care of Rose Polytechnic Institute, Terre Haute, Ind. Place of meeting, Room of R. P. I., Y. M. C. A. Ordinary meetings, first Friday of each month at 8 P.M., unless otherwise specified. Special meetings at call of President. Membership September 1: Active, 10. Exhibitions of pictures submitted for prize competition held monthly. Annual exhibition will be held, date not yet fixed.

RUTLAND CAMERA CLUB.—Rutland, Vermont. Organized October 20th, 1893. *President*, Cornele G. Ross; *Executive Committee*, Cornele G. Ross, V. F. Worcester, N. S. Marshall; *Treasurer* and *Secretary*, V. F. Worcester, 149 S. Main St., Rutland, Vermont. Place of meeting, houses of members. Ordinary meetings, second and fourth Tuesdays in each month except July and August, 8.45 P.M. Special meetings at call of Executive Committee. Annual meeting, second Tuesday in October, 8.45 P.M. Membership September 1: Associate, 2; active, 15; total, 17. Exhibitions, annual print exhibition, date not fixed. Lantern slide exhibitions at irregular intervals.

SCHUYLKILL CAMERA CLUB.—Pottsville, Pa. Organized July 5, 1889. *President*, A. W. Sheafer; *Vice-President*, Miss Elena Roads; *Executive Committee*, The Officers, *viz.*: President, Vice-President, Secretary, Treasurer; *Treasurer*, W. L. Sheafer; *Secretary*, B. S. Simonds. 1432 W. Norwegian Street, Pottsville, Pa. Place of meeting, I.O.O.F. Hall, 107 Market Street. Ordinary meetings, last Friday of month. Special meetings, at call of President Annual meeting, May. Membership September 1: Honorary, 4; active, 37; corresponding, 48; total, 89. Exhibitions, at annual meeting and regular monthly meetings.

SPRINGFIELD CAMERA CLUB.—Rooms, corner State and Dwight Street. Organized, October, 1880. *President*, Bion D. Wheeler: *Executive Committee*, W. P. Draper, Bion W. Wheeler, E. L. Pease, J. W. Knight, John W. Roberts; *Librarian*, Fred. Huntley; *Secretary*, E. L. Pease, 71 James Street, Springfield, Mass: Place of meeting, Rooms corner State and Dwight Streets. Special meetings, at call of Executive Committee. Annual meetings, third Wednesday in October, 8 P.M. Membership September 1: Honorary, 2; active, 64; total, 66.

ST. LOUIS PHOTOGRAPHIC SOCIETY.—Organized 1895. *President*, Dr. C. H. Goodman: *Vice-President*, John B. Holman; *Executive Committee*, John B. Holman, A. L. Bauer, D. B. Howard, Andrew Barada, and the President; *Treasurer* and *Secretary*, A. L. Bauer. Place of meeting. Society rooms, Y.M.C.A. building. Ordinary meetings, first and third Monday in each month excepting July and August. Annual meeting, first Monday in December. Membership September 1: Active, 34. Exhibitions, second Monday in each month. Public exhibitions from time to time.

ST. PAUL CAMERA CLUB.—St. Paul, Minn. Organized March 6, 1896. *President*, James Paris; *Vice-President*, O. F. Brown; *Directors*, Officers, and W. A. Russell, E. F. Zimmerman, D. H. Buckley, Lorn Campbell, J. C. Jenson, A. M. P. Cowley; *Treasurer*, W. B. Thorne; *Secretary*, W. J. Sonnen, care of St. Paul Fire and Marine Ins. Co., St Paul, Minn. Place of meeting, Third and Jackson Streets. Ordinary meetings, no regular meetings during summer months. Special meetings at call of five members. Annual meeting, March. Membership September 1: Honorary, 1; active, 38; total, 39.

SYRACUSE CAMERA CLUB.—322 S. Salina Street, Syracuse, N. Y. Organized 1886. *President*, H. B. Buell; *Vice-President*. J. I. H. Wright; *Directors*, H. B. Buell, J. I. H. Wright, Dan H. Sweet, J. E. Bierhardt, F. L. Barnes, F. W. Field, F. J. Schnauber, H. F. Smith; *Treasurer*, J. E. Bierhardt; *Secretary*, Dan H. Sweet, 246 West Railroad St., Syracuse, N. Y. Place of meeting, 322 S. Salina Street, Ordinary meetings, every Friday evening, 8 P.M. Annual meeting, Friday after first Monday in January. Membership September 1: Honorary, 2; active, 100; associate, 15; total, 117. Exhibitions, annual public exhibition of lantern slides made by members.

THE CAMERA CLUB.—Haverhill, Mass. *President*, Wm. H. Curtis; *Vice-President*, Charles W. Glines; *Secretary* and *Treasurer*, Alfred E. Collins; *Executive Committee*, Geo. E. Dodge, E. H. Lufkin.

TORONTO CAMERA CLUB.—Forum Building, Yonge St, Toronto, Canada. Organized 1891. *President*, Edmund E. King, M.D.; *Vice-President*, (1) W. H. Moss, (2) Ernest M. Lake; *Executive Committee*, W. B. Varley, J. G. Ramsey, H. M. Glover, E. Stanger, H. B. Lefroy, W. Bohne; *Treasurer* and *Secretary*, John J. Woolnough, 94 McPherson Ave., Toronto, Canada. Place of meeting, Forum Building, Yonge St., Toronto, Canada. Ordinary meetings, every Monday evening from October till end of April. Special meetings as required. Annual meeting, first Monday in November. Membership September 1: Honorary, 6; active, 165; non-resident, 10; total, 181. Exhibitions held once a year. The next will be from Dec. 6th to 10th, 1898. Open classes. Gold, silver, and bronze medals and awards of merit.

TOPEKA CAMERA CLUB.—Topeka, Kas. Organized, September 5, 1894. *President*, F. M. Tuckerman; *Vice-President*, R. H. Gaw; *Board of Directors*, F. M. Tuckerman, R. H. Gaw, W. E. Culver, H. W. Seery, Mrs. D. J. Hathaway; *Treasurer*, W. E. Culver, *Secretary*, F. M. Tuckerman, 34 Santa Fe Building, Topeka, Kansas. Place of meeting, members' homes. Ordinary meetings, second and fourth Tuesdays, Annual meeting, second Tuesday in January. Membership September 1: Honorary 6; active, 23; corresponding, 1; total, 30. Exhibitions, annual print exhibit,

TRENTON PHOTOGRAPHIC SOCIETY, THE.—Room 11, Scott Building, Trenton, N. J. Organized January, 1898. *President*, Samuel S. Webber; *Vice-President*, Wm. C. Lawrence; *Board of Trustees*, all officers, and three Trustees, Dr. R. H. Moore, H. G. Aitken, W. W. Slack; *Treasurer*, Frederick P. Auten; *Secretary*, Grant Castner, 51 Bayard Street, Trenton, N. J. Place of meeting, room 11, Scott Building. Ordinary meetings, second Monday evening in each month, except during July and August. Special meetings at call of the President. Annual meeting first Monday in Febrnary, at 8.30 P.M. Membership September 1: Active, 21. Exhibitions, Spring and Fall. The Society is in a very flourishing condition, and the prospects for an increased membership are bright. Visitors are cordially welcomed.

VALLEY CAMERA CLUB.—Organized, November 18, 1896. *President*, W. E. Smith, *Executive Committee*, W. C. Smith, J. F. Hoxie, Chas. T. Howard; *Treasurer*, F. J. Hoxie; *Secretary*, J. Bancroft Lawton, Box 43, Phenix, R. I. Place of meeting; Phenix, R. I. Ordinary meetings, alternate Wednesday evenings at 8 o'clock. Annual meeting, first Monday in April. Membership September 1: Active, 43. Exhibitions, have print exhibits each spring and fall.

WALLINGFORD CAMERA CLUB.—Wallingford, Conn. *President*, Lothar Caron von Grave; *Vice-President*, H. H. Hawkins; *Treasurer*, Prof. Franz Milcke; *Secretary*, F. L. Lathrop. Annual meeting, December.

YOUNG WOMEN'S CAMERA CLUB,—Minneapolis, Minn. Organized, November, 1894. *President*, Miss Mabel Jameson; *Vice-President*, Miss M. Belle Jeffery; *Executive Committee*, The Officers; *Treasurer*, Miss Minerva Turnbull; *Secretary*, Miss M. Eva McIntyre, 1833 Portland Avenue, Minneapolis, Minn. Place of meeting, rooms of Young Women's Christian Association. Ordinary meetings, first Wednesday of each month. Special meetings, outings during the summer months, when prizes are offered. Annual Meeting in September. Membership, September 1: Active, 55.

FOREIGN PHOTOGRAPHIC SOCIETIES.

GREAT BRITAIN AND IRELAND.

Aberdeenshire Amateur Photographic Society.—Hon. Secretary, Lewis C. Jamieson, 40 Brighton Place, Aberdeen.

Accrington and District Camera Club.—Hon. Secretary, Isaac Hanson, Rothwell Heights, Accrington.

Aintree Photographic Society.—Secretary, D. J. Neill, 8 Chelsea Road, Aintree, N. B.

Amateur Photographic Field Club.—Secretary, B. Gay Wilkinson, 151 Bermondsey Street, London, S. E.

Architectural Association Camera Club.—Secretary, C. H. Freeman, 9 Frederick Street, Gray's Inn Road, London, W. C.

Arbroath Amateur Photographic Association.—Hon. Secretary, J. Hood, 94 High Street, Arbroath.

Ashton-under-Lyne Photographic Society.—Hon. Secretary, Robt. T. Marsland, 24 Park Parade, Ashton-under-Lyne.

Aston Natural History and Photographic Society (Photo Section).—Hon. Secretary, F. W. Pilditch, 185 Bevington Road, Aston Park.

Aylesbury Amateur Photographic Society.—Hon. Secretary, J. F. Roche, 2 St. Mary's Square, Aylesbury.

Banbury and District Photographic Society.—Hon. Secretary, J. Davenport, Brookfield, Banbury.

Barnsley and District Photographic Society.—Hon. Secretary, C. R. Barham, 9 Corporation Street, Banbury.

Barrow-in-Furness Naturalists' Field Club (Photographic Section).--Secretary, John Carters, 27 Shakespeare Street, Barrow-in-Furness.

Batley and District Photographic Society.—Secretary, T. H. Fox, Grosvenor House, Batley.

Bath Photographic Society.--Secretary and Treasurer, W. Middleton Ashman, 12a Old Bond Street, Bath.

Belfast Windsor Amateur Photographic Research Camera Club.--Secretary, W. J. Gibson, Montpelier House, Belfast.

Beverley Photographic Society.—Secretary, T. J. Morley, Toll Gavel, Beverley, East York.

Birmingham Photographic Society.—Secretary, C. J. Fowler, Court Mount, Erdington, near Birmingham.

Birmingham Midland Camera Club.--Secretary, H. Cooper, 47 Hagley Road, Edgbaston, Birmingham.

Birmingham Natural History Society (Photographic Section).—Secretary, W. P. Marshall, Richmond Hill, Edgbaston.

Blairgowrie and District Photographic Association.—Hon. Secretary, Thos. G. Gorrie, Beachbank, Rathay, Scotland.

Bolton Photographic Society.—Secretary, J. H. Heyes, Deansgate, Bolton.

Bootle Photographic Society.—Hon. Secretary, F. W. Knowles, 311 Stanley Road, Bootle.

Border Amateur Photographic Association.--Hon. Treasurer and Secretary, B. Cartright, 50 High Street, Galashiels, N. B.

Boston Camera Club.—Hon. Secretary, A. H. Smith, Lindum, Boston, Lancs.

Bournemouth Scientific and Antiquarian Society (Photographic Section).—Hon. Secretary, E. Greenleaves, Priory Mansions, Bath Road, Bournemouth.

"Boys' Own" Postal Photographic Club.—Hon. Secretary, J. E. Hardwich, 7 Bedford Terrace, Sunderland.

Bradford Photographic Society.—Hon. Secretary, J. Snowden, 5 Godwen Street, Bradford.

Brechin Photographic Association.—Hon. Secretary, Alexander Watson, Brechin, N.B.

Brighouse Photographic Society.—Hon. Secretary, J. H. Georgeson, Huddersfield Road, Brighouse.

Brighton Photographic Society.—Hon. Secretary. E. Burnham, 52 Gardner Street, Brighton.

Brighton and Sussex Natural History and Philosophical Society (Photographic Section).—Hon. Secretary, R. Chappell Ryan, 43 Campion Avenue, Brighton.

Bristol and West of England Amateur Photographic Association.—Hon. Secretary, E. Brightman Lyndale, Redland Road, Bristol.

British Association for the Advance of Science.—Burlington House; London, W. Secretary, G. Griffiths, M.A., College Road, Harrow.

Brixton and Clapham Camera Club.—Hon. Secretary, F. W. Leavatt, 11 Corrance Road, Acre Lane, S. W.

Bury Photographic and Arts Club.—Secretary, Roger Wood, 10 Bolton Street, Bury, Lancashire.

Camera & Co.—Hon. Treasurer and Secretary, Albert Forrest, 14 Market Street, Pontypridd.

Camera Club.—Secretary, G. C. S. Knight Bruce, Camera Club, Charing Cross Road, London.

Cardiff Photographic Society.—Hon. Secretary, T. H. Faulks, 127 Bute Road, Cardiff.

Carlisle Amateur Photographic Society.—Secretary, John S. Atkinson, 9 Castle Street, Carlisle.

Cheltenham Amateur Photographic Society.—Hon. Treasurer aud Secretary, Philip Thomas, The College Pharmacy, Cheltenham.

Chester Society of Natural Science and Literature (Photographic Section).—Hon. Secretary and Treasurer, J. H. Spencer, 36 Bridge Street, Chester.

Chichester Photographic Society.—Hon. Secretary, E. A. Long, 15 East Street; Chichester.

Chorley Photographic and Sketching Club.—Hon. Secretary, Thomas Brindle, 62 Market Street, Chorley.

City and Guilds of London Technical College (Finsbury) Photographic Society.—Hon Secretary, E. F. Weismuller, Finsbury Technical College, Leonard Street, City Road, London, E.C.

Cleckheaton Mechanics' Institute Photographic Society.—Secretary, William Drake, Cleckheaton.

Clydesdale Camera Club.—Hon. Treasurer and Secretary, Miss Burns, Castle Wemyss, Wemyss Bay, N.B.

Colne Camera Club.—Hon. Secretary, W. W. Kirk, 16 Atkinson Street, Colne, Lancas.

Cornish Camera Club.—Hon. Secretary, H. Tonkin, 22 Market Place, Penzance.

Coventry and Midland Photographic Society.—Hon. Secretary, H. Mountfort, Hampton House, Coventry.

Crewe Amateur Photographic Society. Hon. Secretary, Mr. T. Gorrell, 106 Edleston Road.

Cromwell Photographic Club, Great Yarmouth.—Hon. Secretary, Charles Rumbold, Jr., 4 Dene Side, Great Yarmouth.

Croydon Camera Club.—Secretary, H. E. Holland, 69 Lansdowne Road, Croydon.

Croydon Microscopical and Natural History Club (Photographic Section).—Hon. Secretary, H. Douglas-Gower, 55 Beneon Road, Wadden.

Cyclists' Photographic Portfolio Club.—Hon. Secretary, W. L. J. Orton, 7 Bishop Street, Coventry.

Darlington Photographic Society.—Hon. Secretary, J. Calvert, 64 North Road Darlington.

Darwen Photographic Association.—Hon. Secretary, J. A. Hargreaves, High Bank, Darwen.

Derby Photographic Society.—Hon. Secretary, A. H. Bennett, 137 Normanton, Derby.

Devonport Camera Club.—Hon. Socretary, E. J. Seymour, 18 St. Aubyn Street, Devonport.

Doncaster Microscopical and General Scientific Society.—Hon. Treasurer and Secretary, M. H. Stiles, 2 French Gate, Doncaster.

Dukinfield Photographic Society.—Hon. Secretary, W. H. Shirley, Commercial Building, Dukinfield.

Dublin Young Men's Christian Association Camera Club.—Joint Hon. Secretary, E. C. Matsen, 34 Capel Street. Dublin.

Dulwich Photographic Society.—Secretary, Herbert John Ellis, 46 Ondine Road, East Dulwich, S. E.

Dundee and East of Scotland Photographic Association.—Hon. Secretary and Treasurer, V. C. Baird. Broughty Ferry, N. B.

Dunstable Photographic Society.—Hon. Secretary, E. Hare, The Poplars, Dunstable.

Durham City Camera Club.—Hon. Secretary, Robert Hauxwell, The Avenue, Durham.

Ealing Photographic Society.—Hon. Secretary, R. T. Murphy, Argyle Road, Ealing, W.

Eastbourne Photographic Society.—Hon. Secretary, J. J. Halloway, 11 Hyde Gardens, Eastbourne.

Eccles Photographic Society.—Secretary, Harold Hepworth, 3 Hall's Buildings, Eccles.

Edinburgh Photographic Club.—Hon. Secretary, T. Barclay, 180 Dalkeith Road, Edinburgh.

Edinburgh Photographic Society.—Hon. Secretary, J. S. McCulloch, 2 George Street, Edinburgh.

Edinburgh University Photographic Society.—Hon. Treasurer and Secretary, H. Overton Hobson, The University Union, Edinburgh.

Exeter Camera Club.—Hon. Secretary, W. L. Jones, 5 Clifton Hill, Exeter.

Fakenham District Camera Club.—Hon. Treasurer and Secretary, Henry Newson, The Square, Fakenham, Norfolk.

Falkirk Amateur Photographic Association.—Secretary, John Higgins, High Street, Falkirk, Scotland.

Falmouth Photographic Society.—Hon. Secretary, J. M. McGill, 9 Albany Road, Falmouth.

Faversham Institute Photographic Society.—Treasurer-Secretary, Charles H. Semark, Stone Street, Faversham.

Finsbury Technical College Photographic Society.—Secretary, F. R. H. Wood, Finsbury Technical College, Leonard Street, London, E. C.

Gainsborough and District Camera Club.—Hon. Secretary, R. C. Puckering, Lee Road, Gainsborough.

Glasgow and West of Scotland Amateur Photographic Association, Glasgow, Scotland.—Secretaries, William Goodwin, 3 Lynedoch Street, Glasgow; J. C. Oliver, 2 Royal Terrace, Glasgow.

Glasgow Photographic Association.—Hon. Seeretary, Fred. Mackenzie, 122 Wellington Street, Glasgow.

Glenalmond Photographic Club.—Secretary, G. L. Lamotte, Trinity College, Glenalmond, Perthshire, Scotland.

Glossop Dale Photographic Society.—Hon. Secretary, T. W. Sharpe, Glossop.

Goldsmith's Institute Camera Club.—Secretary, H. W. J. Browse, Goldsmith's Institute, New Cross.

Goole Photographic Society.—Hon. Secretary, Samuel Wells, Jefferson Street, Goole.

Gospel Oak Photographic Society.—Hon. Secretary. W. A. Palmer, 13 Dale Road Kentish Town, N.W.

Graphic Society.—Hon. Secretary, J. S. Hawker, Mutley House, Plymouth.

Gravesend Photographic Society.—Hon. Secretary, T. L. Winnett, 5 The Grove, Gravesend.

Great Yarmouth Amateur Photographic Association.—Hon. Secretary, G. T. Davis, 4 Market Place, Great Yarmouth.

Great Yarmouth Camera Club.—Hon. Secretary, H. Harvey George, The Tower, Gorleston, Great Yarmouth.

Grimsby and District Photographic Society.—Hon. Secretaries, John H. Clayton, 43 Tarbury Street, Grimsby, and H. Manus, 148 Freeman Street.

Guildford Photographic Society.—Secretary, A. E. Moon, 36 High Street, Guildford.

Hackney Photographic Society.—Secretary, Wm. Fenton Jones, F.S.Sc., 12 King Edward Road, Hackney, London, N.E.

Halifax Camera Club.—Hon. Secretary, Arthur Priestly, 7 Commercial Street, Halifax.

Haltwhistle and District Photographic Society.—Hon. Treasurer and Secretary, David Macadam, Carlisle City and District Bank, Haltwhistle.

Hamilton Photographic Association.—Secretary, W. Macaulay, British Linen Company's Bank, Hamilton, N.B.

Handsworth Photographic Society.—Hon. Secretary, A. E. Segnitz, 141 Hall Road, Handsworth.

Hastings and St. Leonard's Photographic Society.—Hon. Secretary, Algernon Brooker, 21a Wellington Place, Hastings.

Helios Postal Photographic Club.—Hon. Treasurer and Secretary, H. Everett, 125 St. Paul's Road, Bow, London, E.

Herefordshire Photographic Society.—Secretary, C. Gethen, 9 St. Nicholas Street, Hereford.

Holborn Camera Club.—Hon. Secretary, J. Britain, 52 Hilldrop Road, London, N.

Holmfirth Amateur Photographic Society.—Treasurer and Secretary, David Bilson, Birchin House, Holmfirth, Yorkshire.

Hove Camera Club.—Hon. Treasurer and Secretary, E. E. Manwaring, 75 Lansdowne Place, Hove.

Huddersfield Naturalist and Photographic Society.—Hon. Secretary, A. Clarke, 9 St. Andrew's Road, Huddersfield.

Isle of Thanet Photographic Society.—Hon. Secretary, J. C. Goldsack, The Elms, Ramsgate.

Keighley and District Photographic Association.—Hon. Secretary, John Gill, 27 Highfield Lane, Keighley.

Kendal Literary and Scientific Institution (Photographic Section).—Secretary C. R. Hargreaves, 17 Greenside, Kendal.

Kilmarnock and Ayrshire Photographic Society.—Hon. Secretary, William Paterson, Northfield Avenue, Ayr.

Kingsbridge Camera Club.—Hon. Secretary, R. M. Stewart, 56 Fore Street, Kingsbridge.

King's Lynn Photographic Society.—Hon. Secretary, H. Lilson, Railway Road, King's Lynn.

King's Lynn Y. M. C. A. Photographic Club.—Hon. Treasurer and Secretary, William Winch, St. James Street, King's Lynn.

Kingston-on-Thames Photographic Society.—Hon. Secretary, Dr. Finney, Kenless, Kingston Hill, Surrey.

Lake District Camera Club.—Hon. Secretary, W. H. R. Kerry, Wheatland, Windermere.

Lancaster Photographic Society.—Secretary, W. Briggs, 21 Cheapside, Lancaster.

Lantern Slide Exchange Club,—Hon. Treasurer and Secretary, A. J. Richardson, Summerfield, Dore, Sheffield.

Leamington Amateur Photographic Society.—Hon. Secretary, Signor Aspa, Priory House, Leamington.

Leeds Camera Club.—Hon. Secretary, S. Barnes, 16 Lady Lane, Leeds.

Leeds Photographic Sociеey.—Secretary, Alfred Nayler, Providence Terrace, Leeds.

Leicester and Leicestershire Photographic Society.—Secretary, Thos. Brown, 68 Church Gate, Leicester.

Leith Amateur Photographic Association.—Secretary, Alexander Pitkethly 8 Wilkie, Place, Leith, Scotland.

LEWES PHOTOGRAPHIC SOCIETY.—Hon. Treasurer and Secretary, George Carpenter, 81 High Street, Lewes.

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LIVERPOOL CAMERA CLUB.—Hon. Secretary, W. Tansley, 14 Wentworth Street, Liverpool.

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LOUGHBOROUGH LITERARY AND SCIENTIFIC SOCIETY (PHOTOGRAPHIC SECTION).—Hon. Secretary. W. Clarke, Forest Road, Loughborough.

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MANCHESTER PHOTOGRAPHIC SOCIETY.—Secretary, A. E. Casson, 18 Burlington Road, Withington, Manchester.

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MONKLANDS PHOTOGRAPHIC SOCIETY.—Hon. Secretary, William Dixon Gray, 16 Bank, Street, Airdrie, N. B.

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NEWCASTLE ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.—Secretary, Jas. Brown, 31 Market Street, Newcastle-on-Tyne.

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NEWTOWNARDS CAMERA CLUB.—Hon. Secretary, T. Drake, Conway Square, Newtownards.

NORFOLK AND NORWICH CAMERA CLUB.—Hon. Secretary, Col. H. Wood, C.B., 95 Thorpe Road, Norwich.

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North Surrey Photographic Society.—Hon. Secretary, W. H. Baldwin, 49 Christchurch Road, Sheatham Hill.

Nottingham Forest Camera Club.—Secretary, T. B. Henderson, 22 Gauntley Street, Nottingham.

Nottingham Mechanics' Institution Camera Club.—Hon. Secretary, W. Edgar, 123 Clinton Terrace, Nottingham.

Oban Amateur Photographic Society.—Hon. Secretary, S. Lawrence, Chemist, Oban.

Oldham Photographic Society.—Secretary, T. Widdop, 17 Queen Street, Oldham.

Oxford University Photographic Club.—Hon. Secretary, W. E. Moss, Trinity College, Oxford.

Paisley Photographic Society.—Secretary, 'R. Alexander, 2 Gordon Place, Paisley, Scotland.

Park Photographic Association.—Hon. Secretary, Alec. Mair, 12 Arthur Street, Liverpool, E.

Penines Postal Photographic Club.—Hon. Secretary, A. Champness, Sedbergh, Yorks.

Peterborough Photographic Society.—Secretary, A. W. Nicholls, 11 Cromwell Road, Peterborough.

Photographic Club, The.—Secretary, F. A. Bridge, Dalston Lane, London, N. E.

Photographic Convention of the United Kingdom.—Hon. Secretary, R. P. Drage, 95 Bleinheim Crescent, London, W. Meeting in 1897 at Yarmouth.

Photographic Salon.—Hon. Secretary, A. Maskell, Dudley Gallery, Picadilly, London, W.

Photographic Society of Ireland.—Secretary, John A. C. Ruthven, 40 Lower Sackville Street, Dublin.

Photographic Survey Council of Warwickshire.—Hon. Secretary, S. J. H. Pickard, Southfield, Priory Road, Edgbaston, Birmingham.

Plymouth Photographic Society.—Hon. Secretary, R. R. Monk, 4 Frankfort Street, Plymouth.

Postal Camera Club.—Hon. Secretary, F. Griffith, Ennis, Co. Clare.

Postal Photographic Competition Club.—Hon. Secretary, Hugo Meynell, Farley, Cheadle, Stoke-on-Trent.

Postal Photographic Club.—Hon. Secretary, R. A. R. Bennett, Walton Manor Lodge, Oxford.

Preston Camera Club.—Hon. Secretary, Frank Ketton, Oak Cottage, Fullwood, Preston.

Pudsey and District Photographic Society.—Hon. Secretary, John Barron, Lowtown, Pudsey.

Putney Photographic Society.—Hon. Secretary, W. Martin, 4 Lower Parkfields, Putney.

Ramsgate Camera Club.—Hon. Secretary, H. G. Holloway, Jr., Ramsgate.

Redditch Amateur Photographic Society.—Secretary, A. Parr, The Hollies, Besley.

Redruth Photograpmic Club.—Hon. Secretary, E. Berringer, Illogan, Redruth.

Richmond Camera Club.—Hon. Treasurer and Secretary, C. H. Davis, Church Road, Richmond, Surrey.

Rochdale and District Photographic Society.—Hon. Secretary, Herman Bamford, 242 Yorkshire Street, Rochdale.

Rochester Naturalists' Club (Photographic Section).—Hon. Secretary, John Hepworth, Linden House, Chatham.

Rock Ferry Camera Club.—Hon. Secretary, J. W. Kelly, Egerton Park, Rock Ferry.

Romford and District Photographic Society.—Hon. Secretary, A. J. Ormiston, Laurie Square, Romford.

Rossendale Camera Club.—Secretary, A. Thickett, 88 Bank Street, Rautentstall.

Rotherham Photographic Society.—Hon. Secretary, Henry C. Hemmingway, 6 Stanley Street, Rotherham.

Royal College of Science Photographic Society.—Hon. Treasurer and Secretary, C. J. S. Makin, Royal College of Science, South Kensington.

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SOUTHPORT SOCIAL PHOTOGRAPHIC CLUB.—Hon. Secretary, Geo. Cross, Cambridge 15 Arcade, Southport.

SOUTHSEA AMATEUR PHOTOGRAPHIC SOCIETY.—Hon. Secretary, H. T. Lilley, 22 Pelham Road, Southsea.

SPALDING AND DISTRICT PHOTOGRAPHIC SOCIETY.—Hon. Secretary. E. Wightman Bell, High Bridge, Spalding.

ST. BARTHOLOMEW'S HOSPITAL PHOTOGRAPHIC SOCIETY.—Hon. Secretary, M. G. Pearson, St. Bartholomew's Hospital, London, E. C.

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STOCKTON PHOTOGRAPHIC SOCIETY.—Secretary, J. E. Ellam, Yarm, Yorkshire.

STROUD PHOTOGRAPHIC SOCIETY.—Secretary, Thos Hackwood, Beleize Villa, Stroud.

SUNDERLAND PHOTOGRAPHIC ASSOCIATION.—Hon. Secretary, Charles E. Cowper, Thornhill Gardens, Sunderland.

SUN & COMPANY.—A Postal Photographic Society. Secretary, Martin J. Harding, Lexden Gardens, Shrewsbury.

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SUTTON SCIENTIFIC SOCIETY (PHOTOGRAPHIC SECTION).—Secretary, A. P. Hoole, 'The Willows, Sutton, Surrey.

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TODMORDEN PHOTOGRAPHIC SOCIETY.—Hon. Secretary, W. Snowden, 14 Stansfield Street, Todmorden.

TOXTETH AMATEUR PHOTOGRAPHIC SOCIETY.—Hon. Secretary, H. Goldstone, 53 Alwyn Street, Liverpool.

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TUNBRIDGE-WELLS AMATEUR PHOTOGRAPHIC ASSOCIATION.—Secretary, Joseph Chamberlain, 14 Calverley Park Gardens, Tunbridge-Wells.

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Uttqxeter Amateur Photographic Society.—Hon. Secretary, Alfred Parker, High Street, Uttoxeter.

Vale of Llangollen Camera Club.—Hon. Secretary, H. V. Davies, Salop House, Llangollen.

Wakefield Photographic Society.—Hon. Secretary, A. H. Roberts, Stoneleigh Lodge, Wakefield.

Walsall Amateur Photographic Society.—Hon. Secretary, E. A. Day, 52 Short Acre, Wallsall.

Walton Photographic Society.—Hon. Secretary, T. Bickerstaff, 79 Rawcliffe Road, Liverpool.

Walthamstow Photographic Society.—Hon. Secretary, C. S. Scott, Brabourne, Walthamstow.

Walworth Junior Postal Camera Club.—Secretary, P. C. Canford, 36 Inville Road, Walworth, S. E.

Warrington Amateur Photographic Society.—Hon. Secretary, S. S. Stone, 1 Walker Street, Warrington.

Waterloo Social Camera Club.—Hon. Secretary, C. W. Budden, 7 Cambridge Noad, Waterloo, Liverpool.

West Kent Amateur Photographic Society.—Secretary, Edward Hawkins, Manor, Estate, Sidcup, Kent.

West London Photographic Society.—Secretary, J. Stein, 28 Martin's Lane, London.

West Surrey Photographic Society.—Secretary, C. E. White, 17 Garfield Road, Lavender Hill, S. W.

Weymouth and District Camera Club.—Hon. Secretary, Rev. E. C. Bennett, 11 Newberry Terrace, Weymouth.

Widnes Photographic Society.—Hon. Secretary, A. J. Squire, 32 Derby Road, Farnworth, Widnes.

Wigan Photographic Society.—Hon. Secretary. Fred. Betley, 10 Springfield Street, Wigan.

Wolverhampton Photographic Society.—Secretary, G. Hanmer, 2 Sudley Road, Wolverhampton.

Woodford Photographic Society.—Secretary, F. O. Elmer, 1 Florence Villas, Chelmsford Road, Woodford.

Woolwich Polytechnic Society.—Hon. Secretary, J. Borthwick Painting, 3 Friars Villas, Old Charlton.

Worcester Tricycle Club (Camera Section).—Hon. Secretary, T. J. Hobson, 15 Albany Terrace, Worcester.

Wycombe Camera Club.—Hon. Secretary, J. Wilford, 7 High Street, High Wycombe.

York Photographic Society.—Hon. Secretary, F. G. Benson, 50 Scott Street, York.

Yorkshire Philosophical Society (Photographic Section).—Secretary, H. Dennis Taylor, Trenfield, Holgate, York.

BRITISH COLONIES.

Amateur Photographic Association of Victoria.—Hon. Secretary, J. H. Harvey, 278 Victoria Parade, East Melbourne, Australia.

Amateur Photographic Society of Madras.—Hon. Secretary, F. Dunsterville, Royapuram, Madras, India.

Auckland Photographic Club.—Hon. Secretary, G. R. Boulton, Queen Street, Auckland, N. Z.

Ballarat Amateur Photographic Association.—Hon. Secretary, F. Foster, 146 Lydiard Street, Ballarat, Australia.

Cape Town Photographic Club.—Hon. Secretary, A. J. Fuller, Defence Department, Grave Street, Cape Town, South Africa.

Canterbury Philosophical Institute (Photographic Section).—Hon. Secretary, S. Page, Canterbury, New Zealand.

Dunedin Photographic Society.—Hon. Secretary, R. A. Ewing, care of N. Z, Drug Co., Dunedin, New Zealand.

Durban Amateur Photographic Club.—Secretary, J. H. Barn, Durban, Natal, Cape Colony.

Gordon College Amateur Photographic Association, Geelong, Victoria.—Hon. Secretary, J. Hammerton, Jr., 73 Little Ryrie Street, Geelong, Victoria.

GRAHAMSTOWN AMATEUR PHOTOGRAPHIC CLUB.—Secretary, Miss A. B. Clark, West Hill, Grahamstown, Cape Colony.

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MADRAS FINE ARTS SOCIETY (PHOTOGRAPHIC SECTION).—Hon. Secretary, E. T. Robertson, Singapore, India.

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PHOTOGRAPHIC SOCIETY OF INDIA.—Hon. Secretary, T. A. Pope, 57 Park Street, Calcutta, India.

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PHOTOGRAPHIC SOCIETY OF BOMBAY.—Secretary, W. G. Craig, Bombay, India.

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QUEENSLAND PHOTOGRAPHIC SOCIETY.—Hon. Secretary, C. M. Allen, Diocesan Registry, George Street, Brisbane.

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BERLIN FREIE VEREINIGUNG VON PHOTOGRAPHEN.—Sec., Frans Goerke, Massen-Str. 32, Berlin, W.

BERLIN PHOTOGRAPHISCHER-VEREIN.—Addr. Dr. A. Miethe, Rathenon, Berlin.

BERLIN VEREIN ZUR FORDERUNG DER PHOTOGRAPHIE.—Addr. Leon Christman, Winterfeld-Strasse 23, Berlin, W.

BERLIN VEREIN PHOTOGRAPHISCHER MITARBEITER.Addr. Alexander-Strasse 30 Berlin, C.

BRAUNSCHWEIH VEREIN VON FREUNDEN DER PHOTOGRAPHIE.—Addr. Jean Schombart, Brunswick.

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BREMEN GESELLSCHAFT VON FREUNDEN DER PHOTOGRAPHIE.—Addr. F. Tellman, Kronen-Str. 21, Bremen.

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Deutscher Photographen-Gehilfen-Verein.—Addr. Adolph Cordes, Humbold-Str. 25, Hamburg.

Dresden Amateur Photographen-Verein.—Addr. Dr. Kuppendorf, Bismarck-Str. 16, Dresden.

Essen und Benachbare Stadte. Photographische Genossenschaft.—Addr. H. Witticamp, Hügel-Str. 49 Essen a/ Ruhr, Essen.

Frankfurt a/M. Amateur Photographen-Verein.—Addr. Theod. Kühn. Restaurant Hartmann, Bockenheimer. Frankfurt a/M.

Frankfurt a/M. Club von Amateur Photographen.—Gustave Rapp, Kröger-Str. 2, Frankfurt a/M.

Frankfurt Verein zur Pflege der Photographie.—Addr. F. W. Geldmacher. Frankfurt a/M.

Göttingen Photographischer-Verein.—Addr. Prof. D. Berendson, Rothestrasse 5, Göttingen.

Halle a/S. Photographische Gesellschaft.—Addr. C. Knapp, Mühlweg 19, Halle a/S.

Halle Amateur Photographen Verein.—Keil-Strasse 134, Halle a/S.

Hamburg Amateur Photographen-Verein.—Sec., D. W. von Ohlendorff, Ferdinand-Strasse, 25, Hamburg.

Hannover Photographischen Verein.—Dr. J.Knoevenagel, Falken-Strasse, 9, Hannover.

Jena Gessellschaft von Freunden der Photographie.—Addr. Carl Zeiss, Optische Werkstätte. Jena.

Kiel Photographische Gesellschaft.—Addr. Küter-Str. 8, Kiel.

Leipzig Verein von Photographen-Gehilfen.—Addr. G. Keller, Atelier Naumann.

Liegnitz Amateur Photographen-Verein.—Addr. Ober-Post-Assistant Engler.

Magdeburg Amateur Photographen-Verein.—Addr. C. Schröder, Magdeburg, Freidrichstaett Kanonier-Str. 8.

Magdeburg Photographen-Verein.—Addr. Theo. Classen, Altes Brückther, 3.

Munchen Photographische Gesellschaft.—Addr. Deutsches Haus, Karlsplatz.

Munchen Photographischer Club.—Addr. C. Mebelacker, Schwanthaler-Str. 34.

Nürnberg Photographen-Verein.—Addr. "Stadt Wien."

Nürnberg Verein von Freunden der Photographie.—Addr. Theodore Kraft, Hallerwiese, 8.

Osnabrück Camera-Verein von Freunden der Photographie.—I. Israel, Sec.

Plassen Camera-Verein.

Rheinisch-Westphalischer Verein zur Pflege der Photographie, Cologne, a/ R.—Addr. Th. Creifelds, Cologne, a/R.

Schleswig-Holstein Photographen-Verein.—Addr. Otto Koch, Husum, Flensburg.

Schlesische Gesellschaft von Freunden der Photographie.—Addr. Dr. B. Riesenfeld, Ohlauer Stadtgraben 28, Breslau.

Stettin Verein von Freunden der Photographie.—Addr. Paul Fraenkel, Birkenallee 31.

Verband Deutscher und Osterreichisher Amateur-Photographen-Verein.—Addr. Otfried Hamerau, Frankfurt a/M.

Würzburg Verein von Freunden der Photographie.—Addr. Leonhardt Oberhäusner.

AUSTRIA.

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Laibach Club der Amateur-Photographen.—Secretary, Leop. Fürsager, Souvan, in Laibach.

Lemberg Club der Amateur-Photographen.—President, Dr. Carl Stromanger, Advocat, Lemburg, Gailzien.

Photographischer Verein zu Budapest.—Secretary, Alexander Strelisky, Tabakgasse 40, Budapest.

Prague Club der Amateur-Photographen.—Secretary, Bretislav Cermy, Bartolomäigasse 307, Prague, I.

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Reichenburg Club der Amateur Photographen.—Secretary, Dr. Ulbrich, Wiener-Str. 26, Reichenburg, Böhmen.

Salzburg Club der Amateur Photographen.—Secretary, Dr. W. Sedlitzky, Hofapotheker, Salzburg.

Vienna Camera Club.—Secretary, D. S. Hoffman, Elisabeth-Str. 1, Wien, I.

Vienna Photographische Gesellschaft.—Hon. Secretary, Fritz Luckhardt, Karmelitergasse 7, Wien, II,

Vienna Verein Photographischer Mitarbeiter.—Secretary, Rudolf Perlman, Barmherzigengasse 22, Wien, III.

FRANCE.

Association des Amateurs Photographes D'Auvergne.—Secretary, Lenègre, Rue de l'Hotel-Dieu 36, D'Auvergne.

Association Général des Étudiants (Section de Photographie).—Secretary, L. Viguier, Montpellier.

Photo-Club de Lyon et du Sud-Est.—Sec., Charles Bouchage, Place Carnot 11, Lyons.

Photo-Club de Paris.—Sec., Paul Bourgeois, Rue de Rocher 67, Paris.

Photo-Club de Reims.—Sec., Gustave Veroudart, 18 Rue Saint-André, Reims.

Photo-Club Havrais.—Sec., Rue Thiers, 27 Le Havre.

Photo-Club Montilien.—Sec., Derve (Corporal Sedentary of the Forests), á Montélimar.

Photo-Club Nancéen.—Sec., N. P. Bossert, Rue St. Dizier 45, Nancy.

Photo-Club Rouennais,—Sec., Louis Chesneau-Lethullier, Quai Cavalier de la Salle 2, Rouen.

Photo-Union de Nancy.—Sec., Felix Roy, 1 Rue du Pont-Mougin.

Société Caennaise de Photographie.—Sec., Magron, Rue Neuve-Saint-Jean 41, bis, Caen.

Société Dauphinoise d'Amateurs Photographes.—Sec., Charles Giraud, Boulevard de Bonne 14, Grenoble.

Société d'Etudes Photographiques de Paris.—Sec., A. Villain, Route de Flandre 17, Aubervilliers (Paris).

Société d'Excursions des Amateur Photographes.—Sec., Albert Rolland, Boulevard Beaumarchais 43, Paris.

Société de Photographes Amateurs de L'Indre.—Sec., Bruey (chemist), Place du Marché-au-Blé, Chateauroux.

Société des Amateurs et Photographes de L'Eure.—Sec., Ferd. Lemarié (architect), Evreux.

Société des Amateurs Photographes.—Sec., M. Brault, Rue de la Victoire 64, Paris.

Société Francaise dt Photographie.—Sec., Perrot de Chaumeux, Rue de Seine 18, Paris.

Société Havraise de Photographie.—Sec., M. Visconti, Rue Mdme. Lafayette 19, Havre.

Société Nantaise de Photographie.—Sec., Joseph Fraisse, Lajaunais, Saint-Sébastien, Nantes.

Société Niortase de Photographie.—Sec., G. Clouzot, Rue Porte-Saint-Jean, Niort.

Société Photographique Bisontine.—Sec., M. Jouffroy, Rue du Petit Battant 33, Besançon.

Société Photographique du Centre.—Sec., M. De Goy, Rue de Paradis 20, Bourges.

Société Photographique de L'Herault.—Sec., M. L. Baron, Rue du Palais 6, Montpellier.

Société Photographique de Lille.—Sec., Dr. Bernard, Place aux Bleuets 5, Lille.

Société Photographique de Picardie.—Sec., H. Dabonneville, Rue Gresse 60, Amiens.

Société Photographique de Toulouse.—Sec., Prof. C. Fabre, Rue Fermat 18, Toulouse.

Société Photographique de Touraine.—Sec. Bernier, Rue Victor Hugo, 96, Tours.

Société Photographique de Rennes.—Sec., Gustav Maruelle, Rue Baudrairie 2, Rennes.

Société Photographique de la Flèche (Sarthe).—Sec., Bossin, Rue de la Tour, La Flèche.

Société Photographique de la Gironde.—Sec., Ch. Deleyre, Rue Pelegrin 60, Bordeaux.

Société Photographique de la Savoie.—Sec., P. de Guillebon, Place Saint Léger 72. Chamberg.

Société Photographique du Nord de la France.—Sec., Boutique, Rue Saint-Thomas 24, Douai.

Société Photographique du Sud-Ouest.—Sec., E. Ricard, Chemin de la Colonne, Angoulème.

Société Photographique et Aristique de Limoges.—Sec., A. de Galard-Bearn, Avenue Garabaldi, 5, Limoges.

Société Photographique Vincennoise.—Sec., Pebeyre, Avenue Dame Blanche 44, Vincennes.

Société Scientifique et Littérairie.—Sec., Dr. Zaleski, Rue Pasteur 13, Alais.

Société Versaillaise de Photographie.—Sec., Jessé Curely, Rue de Satory 28, Versailles.

Union Française de la Jeunesse.—Sec., G. Felpin, Rue de Passy 74, Paris.

Union National des Sociétés Photographiques de France.—Sec., M. S. Pector, Rue des Petits-Champs 76, Paris.

Union Photographique du Pas-de-Calais.—Sec., J. Descamps, Boulevard Mariette 3, Boulogne-sur-Mer.

BELGIUM.

Association Belge de Photographie.—Secretary, Ch. Puttemans, Rue du Moulin 59, Bruxelles.

Mutuelle Photographique Belge.—President, Aug. Lemaire, addr. Bd. du Hainaut 94, Bruxelles.

Photo Club Hutois.—Sec., A. Lammerl, Athenée Royal, Huy.

HOLLAND.

Amateur Fotografen-Vereeniging.—Amsterdam. Secretary, Michel Ameschat, Amsterdam.

Amateur Fotografen-Vereeniging, "W.I.K."—Amsterdam. Secretary, J. W. H. Van Staer.

Amateur Fotografen-Vereeniging "Daguerre."—Groninogue. Secretary, G. P. Smith, Groninogue.

Bredasche Amateur Fotografen-Vereeniging.—Breda. Secretary, J. S. Rinhes, Bread.

Delftsche Studenten Amateur Fotgorafen-Vereeniging.—L. T. Teixeira de Mattos, Delft.

Geldersche Amateur Fotografen-Vereeniging.—Arnhem. Ph. J. Stokois, Arnhem.

Haagsche Amateur Fotografen-Vereeniging.—Haag. L. Th. G. Mollenger, Haag.

Haarlemsche Amateur Fotografen-Club.—Secretary, J. Bes, Haarlem.

Nederlandsche Vereeniging van Dilettant Fotografen.—Secretary, J. W. H. Van Staa, Amsterdam.

SWITZERLAND.

Cercle des Effigists (Amis Photographes).—Geneva. Secretary F. Mazug, Geneva.

Club Photographique de Zürich.—Secretary, E. Strahl-Nieriker, Zürich.

Club Photographique de Vevey.—Secretary, B. Nicole, Vevey.

La Société Photographique de Lausanne.—Secretary. E. Gautschy, Rue de Bourg, Lausanne.

Photo Club de Neuchâtel.—Secretary, P. A. Perrochet, Neuchâtel.

Société Génévoise de Photographie.—Geneva, Secretary, J. Rey, Geneva.

Société Photographique de Berne.—S. S. Falquet, Berne.

Société Photographique de Bâle.—Bâle.

Société Suisse de Photographie.—Geneva. Secretary, R. Kaiser, Geneva.

DENMARK.

Dansk Fotografisk Fórening.—Secretary, Chr. Chrisstensen, Amagertorne, 31, Cophenhagen.

Fyensk Fotografisk Fórening.—President, L. Dinensen, Sander Nielson, Nyborg.

NORWAY AND SWEDEN.

Norsk Fotografisk Forening.—Christiania. President, L. Szacinski; Secretary, H. Abel, Christiania.

Amator Fotografen in Christiania.—President, Prof. Oscar Platou; Secretary, Henrichsen Josefi, Eegarde 37, Kristiania.

Fotografiska Foreningen.—Stockholm. President, Prof. Dr. B. Hasselberg; Secretary, A. Hasselquist, Stockholm.

Goteborg's Fotografi-Amator-Forening.—Gotembourg. Secretary, Peter Knudsen, Köpmansgatan 8, Gotembourg.

Upsala Fotografi-Foneningen.—Upsala. Secretary, Hj. Lindström. Upsala.

Zinketsare Klubben —Stockholm. John Stahlberg, Westmannagatan 19, Stockholm.

PORTUGAL.

Academia portugueza de Amadores photographicos.—Lisbonne.

FINLAND.

Fotografi Amator Klubben.—Secretary, H. Hintze, Helsingförs.

ALGERIA.

Photo-Club de Constantine.—Secretary, M. Sergère, Constantine.

Photo-Club, Oranais.—Secretary, Louis Giraud, Boulevard du Lycée, Oran.

CHINA.

Foochow Camera Club.—Hon. Sec., J. Mencarini, Foochow, China.

Hong Kong Amateur Photographic Club.—Hong Kong, China.

China Camera Club.—Secretaries, F. J. Mayers, I. M. Customs, Shanghai, China.

Tientsin Amateur Photographic Association.

MEXICO.

Sociedad Fotografica Mexicana.—Hon. Sec., Vincente Vargas Galeana, City of Mexico.

RUSSIA.

Fotografi Amator Klubben in Helsingfors. Finland.—Helsingförs. Secretary, Th. Hahnberg, Estnacgatan 23, Helsingförs, Finland.

Imperial Russian Technical Association (Photographic Department.—St. Petersbourg. President, A. J. Smirnow; Secretary, W. Sreznjewski, 2 Rue Pantelermonowskaja, St. Petersbourg.

Odessa Photographic Society.—Odessa. M. Œ. Schimanowsky, Jamskaja No. 84, Odessa.

Riga Photographic Association, Riga.—President, B. Owsjanckron; Secretary, Adolf Richter, Weidendamm, 3, Riga.

ITALY.

Associacione degli Amatori di Fotografia.—President, Antonio Ruffi (Duc d'Artaglié), Via Poli 25, Rome.

Circolo Fotografico Lombardo, Milano.—Sec., Sig. Amerigo Ponte, Principé Umberto 50, Milan.

Dilettanti Fotografi de Napoli.—President, Duca dé Schiavi, Villa Nazionale, Naples.

Societa Fotografica Italiana.—President, Prof. Cav. Giorgio Roster; Secretary, Guido Vimercati, Via S. Reparata 60, Florence.

Société Photographique de Turin.—President, Félice Alinari, à Turin.

HAWAIIAN ISLANDS.

Hawaiian Camera Club.—President, Walter M. Gifford; Hon. Sec., Clarence W. Ashford, P. O. Box 112, Honolulu.

BRAZIL.

Photo Club of Cearà.—Secretary, Joáo Sidrin, Photo Club of Ceará, Brazil.

JAPAN.

Japan, Photographic Society of.—Secretaries, Prof. H. Ishikaua and Prof. W. K. Burton, Ilchome Nagatacho, Tokio, Japan.

LIST OF THE PRINCIPAL PHOTOGRAPHIC BOOKS PUBLISHED BETWEEN

SEPTEMBER 1, 1897 TO AUGUST 31, 1898.

NOTE.—Publishers of Photographic Works are requested to give us all information regarding their publications in order to make this list as complete as possible.

AMERICAN.

THE AMERICAN ANNUAL OF PHOTOGRAPHY FOR 1898. Edited by Walter E. Woodbury. New York: The Scovill & Adams Co. of N. Y. Price 75 cts. paper; $1.25 cloth.

THE PHOTOGRAPHIC INSTRUCTOR. Sixth Edition. By W. I. Lincoln Adams & Charles Ehrmann New York: The Scovill & Adams Co. of N. Y. Price, $1.00.

SUNLIGHT AND SHADOW. Edited by W. I. Lincoln Adams. New York: The Scovill & Adams Co. of New York. Price, $2.50.

A REFERENCE BOOK OF PRACTICAL PHOTOGRAPHY. By F. Dundas Todd. Chicago: The Photo Beacon Publishing Co. Price, 50 cts.

THE AMATEUR PHOTOGRAPHER. Fifth Edition. By Ellerslie Wallace, M.D. Philadelphia: H. T. Coates & Co.

PICTURE RIBBONS. By C. Francis Jenkins. Washington: Published by the author. Price, $5.00.

THE INTERNATIONAL ANNUAL OF ANTHONY'S PHOTOGRAPHIC BULLETIN FOR 1898. Edited by W. I. Scanlin. New York: E. & H. T. Anthony & Co. Price, 75 cts. paper; $1.25 cloth.

PICTURESQUE BITS OF N.Y. AND OTHER STUDIES. By Alfred Stieglitz. New York: R. H. Russell.

LANTERN SLIDES BY PHOTOGRAPHIC METHODS. By Andrew Pringle. Second Edition. New York: The Scovill & Adams Co. of N.Y.

PICTORIAL EFFECT IN PHOTOGRAPHY. By H. P. Robinson. Fourth Edition. New York: The Scovill & Adams Co. of N.Y.

PHOTOGRAPHIC MOSAICS. Edited by E. L. Wilson. New York: E. L. Wilson. Price, 50 cts.

PHOTOGRAPHIC AMUSEMENTS. By Walter E. Woodbury. Third Edition. New York: The Scovill & Adams Co. of N.Y. Price, $1.00.

PORTRAITS IN PHOTOGRAPHY BY THE AID OF FLASHLIGHT. By F. W. Guerin. New York: The Scovill & Adams Co. of N. Y., Agents.

THE ENCYCLOPÆDIC DICTIONARY OF PHOTOGRAPHY. By Walter E. Woodbury. New York: The Scovill & Adams Co. of N.Y. Price, $5.00.

IN NATURE'S IMAGE. By W. I. Lincoln Adams. New York: The Scovill & Adams Co. of N.Y. Price, $2.50.

THE PLATINOTYPE. By Capt. Abney and Lyonel Clark. Second Edition. New York: The Scovill & Adams Co. of N.Y.

PRACTICAL HALF TONE AND TRI-COLOR ENGRAVING. By A. E. Austin. Buffalo, N.Y. The Professional Photo Publishing Co.

ENGLISH.

PHOTOGRAMS OF '97. By the editors of *The Photogram*. London: Dawbarn & Ward.

THE MAGIC LANTERN JOURNAL AND PHOTOGRAPHIC ENLARGER ALMANAC, 1897-1898. Edited by J. Hay Taylor. London: The Magic Lantern Journal Co.

THE BRITISH JOURNAL ALMANAC FOR 1898. Edited by Thos. Bedding. London: H. Greenwood & Co.

THE PHOTOGRAPHERS' DIARY FOR 1898. London: Charles Letts & Co.

Popular Photographic Printing Processes. By Hector McLean. London: L. Upcott Gill.

How to be a Successful Amateur Photographer. By W. J. Lancaster.

A Guide to Modern Photography. By Harold Baker. London: Iliffe Sons.

The Action of Light in Photography. By Capt. Abney, C.B. London: Sampson, Low & Co.

Animated Photography. By C. M. Hepworth. London: Hazell, Watson & Viney.

Architectural Photography. By G. A. T. Middleton. London: Hazell, Watson & Viney.

The Story of Photography. By Alfred T. Story. London; George Newnes.

The Gum Bicromate Process. By W. J. Warren. London: Iliffe Sons.

The Year Book of Photography. Edited by E. J. Wall. London: *The Photographic News.*

Practical Pictorial Photography. By A. Horsley Hinton. London: Hazell, Watson & Viney.

The Use of the Hand Camera By Clive Holland. London: Archibald, Constable & Co.

Photography. By Rev. A. H. Blake. London: George Routledge & Co.

Photographic Annual for 1898. Edited by Henry Sturmey. London: Iliffe Sons.

GERMAN.

Die Entwicklung der Auscopien Papiere. By R. Ed. Liesegang. Dusseldorf: Ed. Liesegang's Verlag.

Photographischer Almanach für das Jahr 1897. Düsseldorf: Ed. Liesegang.

Die Chromo-Lithographie. By Dr. Friedrich Hesse. Halle a-S: Wilhelm Knapp.

Handbuch der Chemigraphie. By Wilhelm F. Torfel. Vienna: A. Hartleben.

Die Kunst in der Photographie. Berlin: Julius Becker.

Handbuch der Photographie. By Dr. H. W. Vogel. Berlin: Gustav Schmidt.

Praktikum der Wissenschaftlichen Photographie. By Dr. Carl Kaiserling. Berlin: Gustav Schmidt.

Ausführliches Handbuch der Photographie. (Vol IV. Part I.). By Dr. Eder. Halle a-S: Wilhelm Knapp.

Die Farben Photograf. By Dr. Neuhauss. Halle a-S: Wilhelm Knapp.

Das Fernobjectif. By Hans Schmidt. Berlin: Gustav Schmidt.

Jahrbuch für Photographie, 1898. Edited by Dr. Eder. Halle a-S: Wilhelm Knapp.

FRENCH.

Traite Encyclopédique de Photographie. By Chas. Fabre. Paris: Gauthier Villars et Cie.

Les Papiers Photographiques au Charbon. By R. Colsen. Paris: Gauthier Villars et Cie.

La Chronophotographie. By L. Gastine. Paris: Gauthier-Villars et Cie.

La Photographie dans Les Apartements. By Albert Reyner. Paris: Bernard Tignol.

L' Optique Photographique. Par P. Moessard. Paris: Gauthier Villars et Cie.

Formulaire des Nouveautés Photographique. By George Brunel. Paris: J. B. Ballière et Fils.

Les Rayons Roentgén. By Charles Henry. Paris: Société d' Editions Scientifiques.

Memoires Originaux de Createurs de la Photographie. By R. Colson. Paris: Georges Carré et C. Naud.

HOTELS HAVING DARK-ROOMS FOR THE CONVENIENCE OF TOURIST PHOTOGRAPHERS.

CALIFORNIA.

East Pasadena—The Raymond.
Monterey—Del Monte.
Santa Barbara—San Marco.
San Diego—Hotel Coronado.
San Rafael—Hotel Rafael.
The Geysers, Sonomo Co.—The Geysers.

NEW YORK.

Adirondacks—Cascade Lake House. Has a dark-room with running water.
Big Indian, Catskill Mountains—Slide Mountain House.
Blue Mountain Lake, Hamilton County—Prospect House.
Haines Falls, Green Co.—Kenwood Hotel. Room for two to work at once in dark-room.
Lakewood—The Stillingsworth.
Lake George—Fort William Henry Hotel.
Lake George, Bolton—Lake View House.
Kidders Ferry, Cayuga Lake—Coles Hotel.
Niagara Falls—Spencer House.
Hunter—Breeze Lawn. Has a dark-room with running water.
Westport—The Westport Inn. Has a dark-room with running water.

NEW HAMPSHIRE.

Littleton—Chiswick Inn.
White Mountains—Profile House.
Mt. Washington—Summit House.

NORTH CAROLINA.

Hot Springs—Mountain Park Hotel.

MICHIGAN.

Oden—The Atherton Hotel.

ONTARIO.

Muskoka, Lake Joseph—The Stanley House.

PENNSYLVANIA.

Dingman's Ferry—High Falls House.
Sullivan Co.—Hotel Eaglesmere.

GEORGIA.

Savannah—Hotel de Soto.

FLORIDA.

St. Johns—Magnolia Hotel.
Tampa—Tampa Bay Hotel.

MAINE.

South Poland—Poland Spring House. Fine studio and three dark-rooms for exclusive use of amateur photographers.

TENNESSEE.

Harrogate—The Four Seasons.

MASSACHUSETTS.

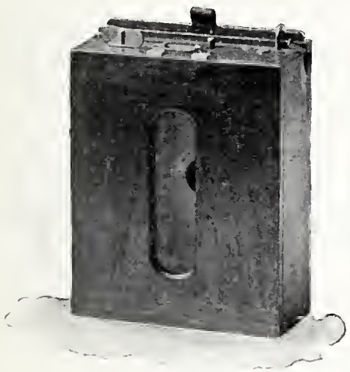
Pittsfield—Maplewood Hotel.

DISTRICT OF COLUMBIA.

Washington—Arlington Hotel.

NEW BRUNSWICK.

St. Andrews—The Algonquin.



Cartridge Roll Holder Showing Back.

Cartridge Roll Holder Showing Front.

There is no Kodak but the Eastman Kodak.

Eastman's Permanent Bromide Papers Are the Standard.

ROYAL BROMIDE PAPER.—Enlargements on this paper made through bolting cloth and sepia toned have the softness and beauty of rare old etchings. Nearly all of the enlargements shown in our famous London and New York exhibitions, which received such favorable comment from the public and the press, were made on Royal Bromide.

STANDARD BROMIDE PAPER is a natural surface paper which is especially adapted to all kinds of enlargements on which crayon or pastel work is to be done.

PLATINO BROMIDE PAPER gives results so near like Platinum, that the difference, if any, would be difficult to detect. It has a fine surface and is best adapted for contact prints and enlargements from life negatives.

MATTE-ENAMEL BROMIDE PAPER.—Rich carbon blacks and a smooth velvety Matt surface tinted just enough to lend warmth to the high lights and half tones. giving with Matte-Enamel an effect not heretofore obtained with Bromide papers. When used with life negatives enlargements can be made that closely resemble Matt contact prints.

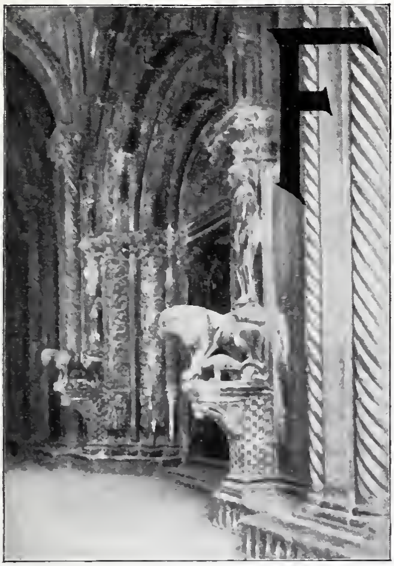
This paper gives excellent sepia tones, and is especially recommended for enlargements 16 x 20 and under, when it is desired to make prints ready for delivery by simply spotting. Its fine grain gives an excellent tooth on which to work crayon or pastel; it can also be finished in India ink, water colors or oil. Try this paper on solid prints from life negatives made for Matt Surface work.

ENAMELED BROMIDE PAPER.—A glossy Bromide paper, which when used with life negatives gives enlargements which closely resemble glossy contact prints. It gives excellent sepia tones and can be finished in water colors washed in, or with the air brush. When squeegeed to ferrotype plate it gives a gloss which is fully equal to that produced by the glacé process.

For sale by all dealers.

EASTMAN KODAK CO.

Rochester, N. Y.



Trau Cathedral, Dalmatia. By John Bushby.

FLASH-LIGHT PHOTOGRAPHY

WITH

SCOVILL'S

SAFE

SPECIALTIES.

"A MORNING GLORY"

THE BYRON LAMP
for Flash-Light Photography.

THE subject of Flash-Light Photography was very ably treated by the well-known expert in that line, Mr. Charles Mills, in the April number of "The Photographic Times." We mention this fact for those interested in Flash-Light Photography would find that article of great assistance in their work. Referring to lamps, Mr. Mills says:

"Most lamps procurable have inadequate illuminating power. They either do not consume magnesium enough, or not quickly or effectively. Even in interiors, without life, it is an advantage to use a powerful light to "get there before the smoke does," especially if the currents of air are from behind, and, with people, the confidence a good light gives the operator is of great assistance. He can then see that the people are still and used to the light before commencing the exposure. Artistic effects are best obtained by light of larger area, and this is the more easily effected by having more than one point or source of light, and with one well forward to one side—moving them during exposure—modeling and relief is obtained. The following points should be noted in the selection of a lamp:

It should not be awkward or bulky in shape, but rather packed with your goods when not in use.

It should be easily and quickly got into action, and repeatedly operated without much thought or attention.

In the Byron, a duplex lamp, just introduced by the Scovill & Adams Company of New York, these points have been met and covered in a brainy way by one who has been there himself. They come in pairs for artistic lighting. It packs with your traps, it gets into action

MISS SHIELD'S STUDIO. FLASH-LIGHT WITH "BYRON" LAMP.

quickly, it keeps in action easily, it is powerful yet not wasteful, it is safe and certain. It is the cheapest high-class lamp on the market.

The price of the Byron lamp is as follows:

Outfit consisting of	Two lamps, in a case, Reflector, to slide in groove back of lamp, Flask for magnesium, Flask for alcohol, and Rubber tubing,	**$8.00**

The price of a single lamp is $5.00.

DIAGRAM OF BYRON LAMP.

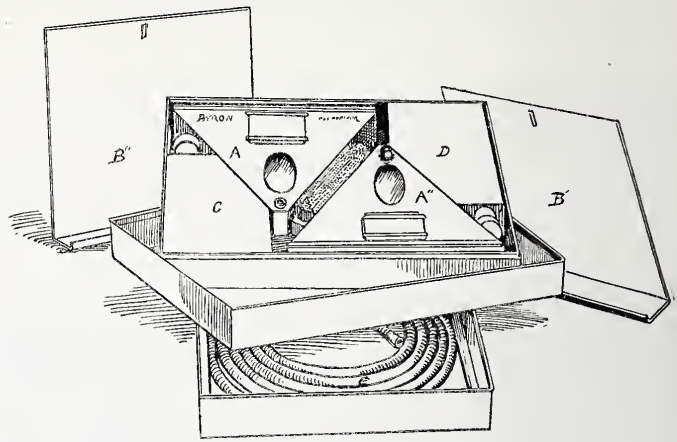


Fig. 1.

A' A''. Lamp in case.
B' B''. Reflector to slide in groove back of lamp.
C. Flask for magnesium.
D. Flask for Alcohol.
E. Rubber tubes.

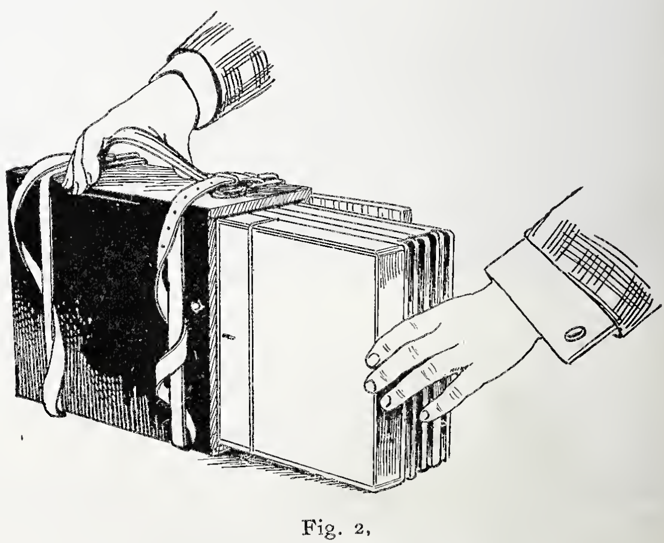


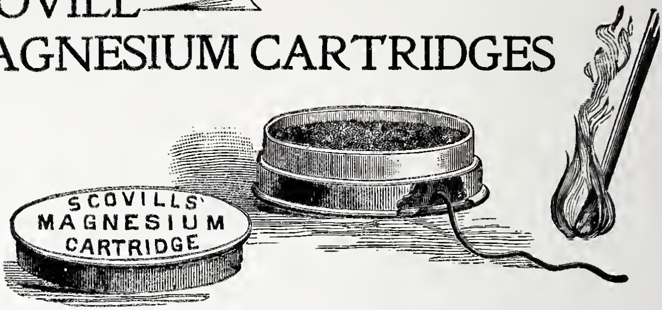
Fig. 2,
Showing how Flash-Lamp can be packed with slides.

SCENE FROM "THE BANKER'S DAUGHTER."
(*Taken with the Mills' Electric Flash Wand.*)

SCENE FROM "THE RAGGED REGIMENT."
(*Taken with the Mills' Electric Flash Wand.*)

PORTRAIT MADE IN ORDINARY ROOM WITH
MILLS' ELECTRIC FLASH WAND.

SCOVILL
MAGNESIUM CARTRIDGES



FOR FLASH-LIGHT PHOTOGRAPHY.

The Scovill Magnesium Cartridges have been in use for the last ten years. They are well known the world over. Do not experiment with other yet untried cartridges. Magnesium compounds are dangerous unless prepared by the Scovill secret formula.

PRICE OF THE SCOVILL MAGNESIUM CARTRIDGES.

IN SILVER PAPER WRAPPERS.

	Per Doz.	Per Gro.
No. 1. —Small Size, 20 grains, - - - - - -	$0.50	$6.00
" 2. —Medium, 40 grains, - - - - - - -	0.80	9.00
" 2½.—Large, 60 grains, - - - - - - -	1.20	13.00
" 3. —Extra Large, 80 grains, - - - - - -	1.50	17.00

SCOVILL
ELECTRIC FLASH COMPOUND

Produces Least Smoke, Least Dust,
Most Light, Most Speed.

IT IS SAFE AND SURE.

Price per ounce, full weight, - - - - - - - - $0.60

Goerz's Double Anastigmat F:7.7.

THE lenses of this series are **universal** instruments in the full sense of the word. At full aperture they admit of instantaneous photographs embracing an angle of 70° being taken, even on dull days. By the use of small stops the photograph may be made to include an angle of 90°. The Double Anastigmats of Series III satisfy, therefore, the highest requirements and are eminently adapted for all-round purposes, in and out of doors.

As the image is perfectly sharp, even with large apertures, the definition, brilliancy and depth of every point of the field is absolutely uniform. Hence, perfectly sharp, wide-angle, instantaneous photographs may be taken.

The **back lens,** the focus of which is about the double of that of the entire objective, may, by itself, be used as a landscape lens.

No.	Equivalent Focus. *in.*	Free Aperture. *in.*	Size of Plate Sharply Covered at			Code Word.	Price, With Iris-Diaphragm.
			F: 7.7 *in.*	F: 15.5 *in.*	F: 62 *in.*		
00	3¼	½	3x3	3¼x4¼	4x5	Cadiz	35 50
0	4¾	⅝	3¼x4¼	4x5	4¾x6½	Caesar	37 50
1	6	⅞	4x5	4¾x6½	5x8	Calderon	45 00
2	7	1	4¾x6½	5x8	7x9	Calla	51 50
3	8¼	1¼	5x8	2½x8½	8x10	Calvin	62 50
4	9½	1 5/16	6½x8½	7x9	10x12	Camerun	75 50
5	10¾	1½	7x9	8x10	12x15	Camillus	91 00
6	12	1⅝	8x10	10x12	16x18	Canada	107 00
7	14	2	10x12	12x15	18x22	Capet	140 00
8	19	2⅝	12x15	16x18	22x25	Carlos	219 00
9	24	3 5/16	16x18	18x22	24x30	Census	325 00
10	30	4¼	18x22	22x25	28x36	City	539 00
11	35	5	22x25	24x30	34x44	Columbia	1070 00

Nos. 00 to 5 are particularly adapted for hand and traveling cameras. The higher numbers will be found of great service for large portraits and group photography and similar work.

The size of plate indicated sub F : 7.7 represents the area which is **sharply covered up to the edge.** It is, however, advisable to select a higher number than that actually required in all cases where the lens is largely used at full aperture and where, at the same time, it is important that the entire plate should be uniformly illuminated when the camera front is moved out of its central position.

I am prepared to supply lenses mounted for adaptation to detective cameras, if ordered in sufficiently large numbers.

For stereoscopic views the lenses are "paired" at an extra charge of $2.50.

Series IV.

Goerz's Double Anastigmat F:11.

RAPID COPYING LENS.

For full-size reproductions, enlargements, large groups, landscapes, instantaneous photography and interiors.

SERIES IV of the Double Anastigmatic Lenses has been specially computed for **copying** in full size. It is, for this purpose, made to cover a plate of a diameter which is double the focal length of the lens without any distortion and without astigmatic aberrations and with perfectly uniform sharpness up to the extreme edge.

This excellent lens may also be used for photographing distant objects ; for in this case the curvature of the image is barely appreciable and is counterbalanced by the depth of the focus and the sharpness of the image, which is free from astigmatic aberrations. The sharp image subtends an angle of 75° with the largest stop; hence, **instantaneous wide-angle photographs, groups, landscapes and architectures** may be taken with these lenses. By means of small stops the image may be made to embrace an angle of 90°.

The hood is, as may be seen from the illustration, detachable and is fitted on in such a manner as to admit of the adaptation of a prism or mirror.

The back lens, whose focus is about double that of the whole objective, may in like manner as the lenses of series III be used by itself as a landscape lens.

No.	Equivalent Focus.	Free Aperture.	Normal Size of Plate for Copying at F:15.5 to F:22		Size of Plate Covered at		Code Word.	Price.
			In Life Size.	In Reduced Size.	F:15.5 For Groups	With smaller stops for landscapes, interiors, etc.		With Waterhouse Stops.
	in.	*in.*	*in.*	*in.*	*in.*	*in.*		
6	12	$1\frac{1}{16}$	16x18	10x12	10x12	16x18	Damara	$110 00
7	14	$1\frac{5}{16}$	18x22	12x15	12x15	18x22	Darius	141 50
8	19	$1\frac{3}{4}$	22x25	16x18	16x18	22x25	Dekan	230 00
9	24	$2\frac{1}{8}$	24x30	18x22	18x22	24x30	Dictator	345 00
10	30	$2\frac{3}{4}$	28x36	22x25	22x25	28x36	Dolomit	565 00
11	35	$3\frac{1}{4}$	34x44	24x30	24x30	34x44	Doria	1096 00
12	47	$4\frac{5}{16}$	40x60	28x36	28x36	40x60	Drusus	1980 00

The normal plate sizes tabulated above for copying in full size are covered with great uniformity and with a degree of sharpness which is equal to that of a fine engraving. Where this degree of sharpness is not insisted upon, *e. g.*, for reproductions in mezzo-tint, the same area may be covered with full aperture.

In order to obviate any misunderstanding, I beg to remark that the double anastigmatic lenses F : 11 cover a considerably larger plate than those usually required by photographers, for nearly all cameras now in use are designed for long focus lenses, owing to the inferior capabilities of the older types of copying lenses. For this reason it is often advisable not to choose a lens of inconveniently short focus, but rather to take the next size larger.

New Sector Shutter.

(GOERZ PATENT.)

THIS new shutter is formed by segments situated in the plane of the diaphragm, and opening from and closing towards the centre. This Shutter not only combines the good qualities of the best systems of shutters hitherto known, but actually surpasses them in many respects.

Its advantages are as follows:

1. **Simplicity of mechanism,** hence permanently uniform and reliable action.

2. All moving parts are **completely covered** in, hence they are not susceptible to disturbing external influences, such as concussion, dust, moisture, etc.

3. It can be fitted **between lens systems which have very little separation from each other** (*e. g.*, double anastigmats with short focus), as the segments are one-tenth of a millimetre only in thickness,

4. After opening with the greatest velocity, it will remain for a certain period in this fully-opened position, thereupon closing with the same rapidity. Hence the Lens will work during the greater part of the time of exposure **with the full size of opening for which it is set.**

5. It will work without any shock or jerk, and permits, with certainty, great variations of speed, ranging from $\frac{1}{150}$ to one second. The speeds marked on the shutter are absolutely reliable, and will apply equally for any adjustment or "size of stop." In most shutters hitherto known the speed will vary with the "size of stop" for which they are set, even without any alteration of the speed adjustment.

6. It serves at **the same time as a "stop"** and can be adjusted for any desired "size of aperture."

7. It is set for action **without opening** it in doing so.

8. It is perfectly light-proof, its manipulation is most simple, and it is very light, being made of aluminium (Nos. 1 to 4 weigh 2¾ ounces only); it occupies very little space. (See illustration showing full size). The workmanship is most perfect.

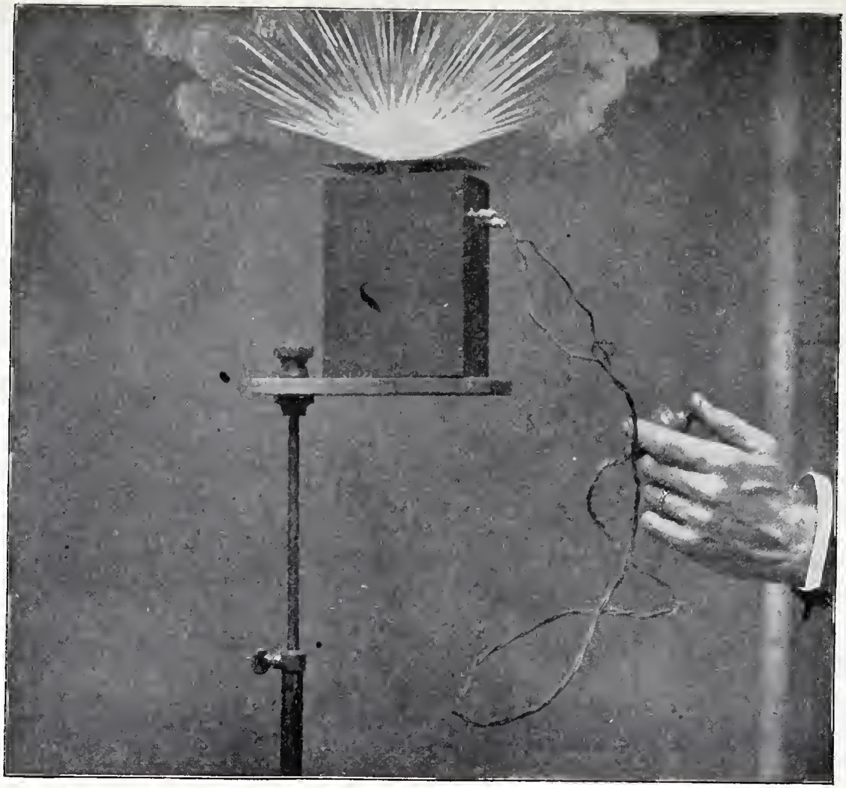
The Shutter being fitted between the Lenses, it is necessary that it should be well centred with them. We cannot guarantee faultless mounting unless the Lens, whether of our make or of any other, is sent to us for fitting.

So far, the segmental Shutter is made in the following sizes only, suitable for Lenses as stated below:

Size of Shutter.	Diameter of Lens Tube.		For GOERZ'S LENZES. Series and No.	PRICE
	mm.	in.		
1	34	1⅜	Double Anastigmat III/0	$22 00
2	34	1⅜	Double Anastigmat III/1	22 00
3	38	1½	Double Anastigmat III/2	22 00
4	44	1¾	Double Anastigmat III/3	22 00

The Shutter can also be fitted to any other Lens with a similar diameter of tube, provided that the largest size of stop is not more than 24 mm (= 1 inch) in diameter. Cost of fitting, $1.50 to $2.50 each, according to size. The original Lens Tube is not altered and will be returned.

No charge will be made for fitting if the Shutter is ordered *simultaneously with* one of our Lenses.



SPRINGTIME
BY KNAFFL & BRO

BADGLEY'S
IMPROVED
Combination Carrier and Grounds.

(*Patented.*)

WITH FLOOR-CLOTH ATTACHMENT.

Read What is Said About it. . . .

"ROCKWOOD,
PHOTOGRAPHER."
1440 Broadway (40th St.), N. Y.
GEO. E. ROCKWOOD,
Pres't and Treas.
J AUG. RANDEL,
Vice-Pres't and Sec'y.

NEW YORK, Jan. 21, 1898.
The Badgley-Graham Co.,
Louisville:

My Dear Sirs:—The old saying is that "Time is Money" and space is rent, especially in New York. Both of which phrases apply to your wonderful carrier and the grounds furnished with it, which economize space to a wonderful degree, and is handled so quickly that it is the greatest delight to have it.

I want to praise it as strongly as words can do so. We use it almost altogether. Do you realize that while you sold me six grounds, yet by raising or lowering them a little at a time, we get the effects of as many more.

Yours very truly,
GEO. G. ROCKWOOD.

THIS CARRIER is capable of carrying any number of grounds, from 2 to 25; five, six or seven feet wide, four, five, six, seven or eight feet high. Grounds are painted or attached in one continuous strip, rolled from one roller to the other, bringing any effect to its desired position. Adapted for heads, children, three-quarter and full length figures Now in use in over 200 of the leading galleries in the United States and foreign countries.

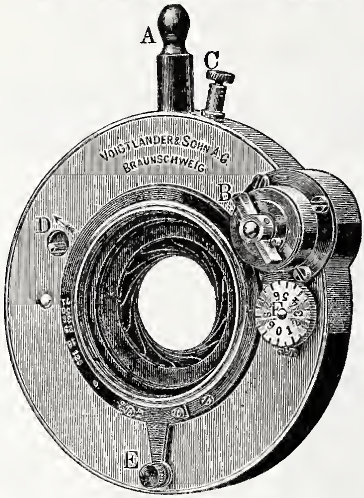
Price of Carriers, $16.00. Grounds, 15 cents per square foot, on burlap. Floor Cloths on spring roller, $5.00.

Address your dealer or the manufacturers.

Also Manufacturers, Importers and Dealers in PHOTOGRAPHIC MATERIALS of Every Description.

THE BADGLEY-GRAHAM CO.,
351 & 353 W. Jefferson St., LOUISVILLE, KY.

The Novelty of the Year.



THE

IMPERIAL SHUTTER

A recent and patented construction by Voigtländer & Son of Braunschweig, Germany. Made exclusively for the **Collinear** and **Euryscope Lenses.**

Sole Agents: **Benj. French & Co., Boston, Mass.**

J. Warner Bott,
President and Tresurer.

J. Allen Warner,
Vice-President and Secretary.

Albany Card and Paper Manufacturing Co.

Manufacturers of

Fine Photographic Card Stock

ALBANY, NEW YORK.

THE SUNFISH (*lepomis gibbosus*) PHOTOGRAPHED NATURAL SIZE FROM THE LIVING SPECIMEN

BY DR. R. W. SHUFELDT

FALLEN MAJESTY
BY F. HUBER HOGE

ADRIFT
BY H. C. DELERY

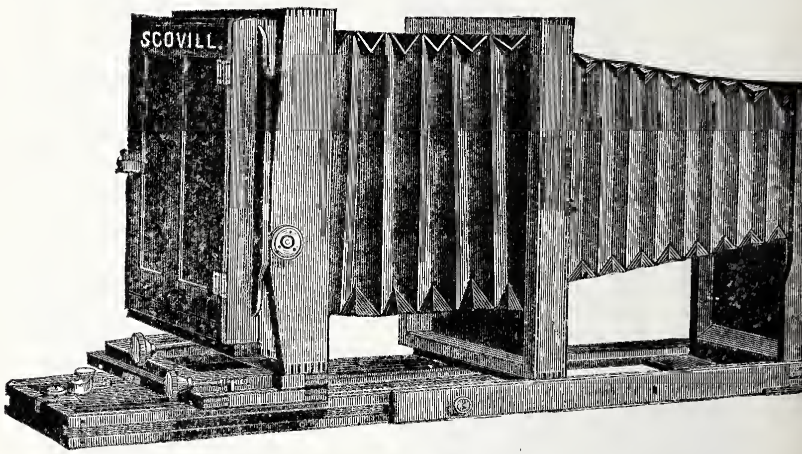
A STUDY IN BLACK AND WHITE
BY CHAS. J. BERG

GALATEA
BY J. W. ANDERSON

THE AMERICAN OPTICAL CO.'S

UNRIVALED

PORTRAIT CAMERAS.



The American Optical Company Portrait Cameras are manufactured from the best mahogany, French polished, and have the Lever Focusing Attachment, by which the most delicate focus can be adjusted with the utmost facility and ease. Above 10 x 12 size, they have double bellows, vertical shifting front, the V-shaped wooden guide, and telescopic platform.

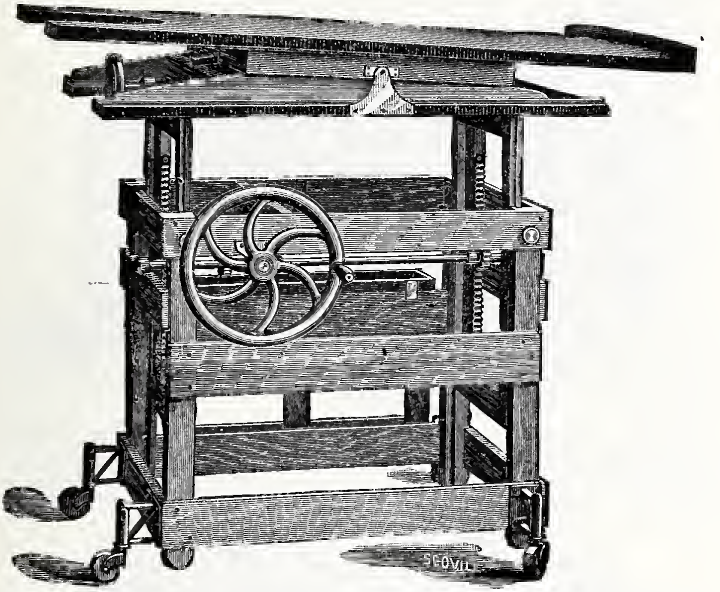
No. Size.							With Double Swing-back.
5— 8x10	ins.,	with rigid	platform	30	ins.	long..................	$38 00
6—10x12	"	" "	"	36	"	....	48 00
7—11x14	"	extension	"	48	"	double bellows and vertical shifting front,	64 00
8—12x15	"	"	"	48	"	"	72 00
9—14x17	"	"	"	60	"	"	76 00
10—16x20	"	"	"	65	"	"	88 00
11—17x20	"	"	"	65	"	"	90 00
12—18x22	"	"	"	70	"	"	100 00
13—20x24	"	"	"	72	"	"	110 00
14—22x27	"	"	"	72	"	"	130 00
15—25x30	"	"	"	80	"	"	170 00

Buy from Dealers or the Scovill & Adams Company.

THE

"ELITE" STUDIO STAND.

(PRIZE WINNER.)



Patented.

These are the only Stands suited in workmanship and finish, also in size, to the large American Optical Co.'s Cameras, with their great length of bellows and extension platform. Practical portraitists cannot fail to admire the ease with which these stands can be adjusted at any desirable height or inclination, and the noiseless manner in which they may be moved from place to place, their elegant appearance and accurate construction.

Instead of the clumsy levers and racks, by which accurate adjustment of the platform was obtained in the older stands; the proper elevation and inclination are produced in the "Elite" stand by cog-wheel and snake screw, and the manipulation at one side by a wheel with handle, and within reach of the operator, so that he may adjust the height or inclination of this camera without taking his head from under the focusing cloth. By means of the wheel worked at the rear end of the platform, the horizontal position of the platform may be inclined upward or downward to a limit of 15 degrees. A great advantage from this movement, we observe, is that a true horizontal position—so difficult to obtain in the old camera stands—is, with these, an easy matter to effect. This is especially important to those who may use them for reproduction work. In the No. 2 size the platform is fifty-two inches long and twenty-five inches wide, and its length may be increased to seventy inches by an attachment which slides out forward, making it quite long enough for supporting a large copying camera. Then a semi-circular cut-out, to the rear end of the platform, is a convenience to the operator, who is thus enabled not only to stand closely up to the ground glass, no matter how far the camera may have been pushed forward, but bending of the body is obviated, which is quite a necessity with all the older stands.

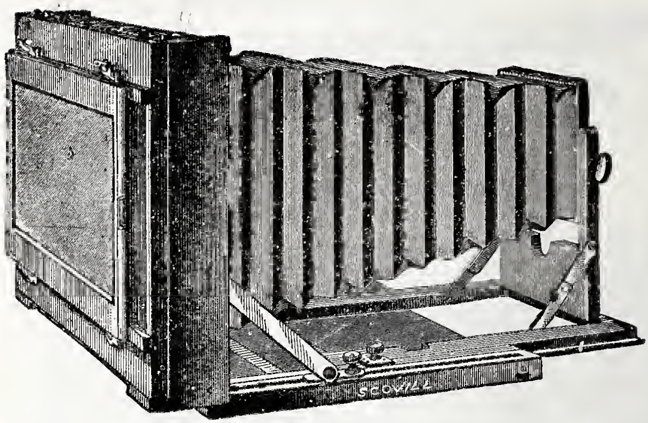
"ELITE" STUDIO STANDS

	No. 1 Size.	No. 2 Size
PRICE, with Rack and extension for Plate Holder	$32.00	$36.00
Highest point from platform to floor	48	48
Lowest " " " "	32	32
Width of platform	22	26
Length of platform without attachment	45	52
" " with "	60	70

For Sale by all Dealers in Photographic Materials and The Scovill & Adams Company.

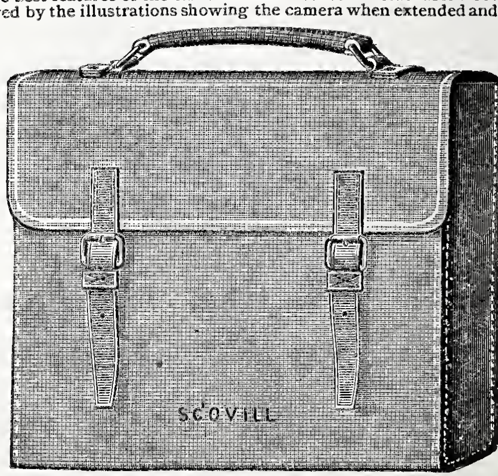
IRVING VIEW CAMERAS.

The IRVING Camera recently introduced by the American Optical Co. was awarded the highest prize by the judges at the American Institute Fair. They expressed themselves as unable to see how a more complete, compact, light, handsome and serviceable camera could be made.



The Irving Cameras all have swing front in addition to swing back, vertical shifting front board. They have the Howe patent reversible back, fitted with self-locking ground-glass frame, and when desired, celluloid is used in place of glass for the focusing screen.

One of the best features of the camera is the absence of detachable screws. An idea of this is conveyed by the illustrations showing the camera when extended and when folded.



A superb canvas case, the finest ever made, is supplied with each one of the Irving Cameras. Price list is as follows:

Size	Single Swing.	Double Swing.	Size	Single Swing.	Double Swing.
4 x 5	$27.00	$32.00	10 x 12	60.00	$65.00
5 x 7	33.00	38.00	11 x 14	65.00	70.00
5 x 8	35.00	40.00	14 x 17	75.00	80.00
6½ x 8½	40.00	45.00	17 x 20	85.00	90.00
8 x 10	45.00	50.00	18 x 22	95.00	100.00

In order to convey an idea of the lightness of these cameras, it is sufficient to say that the 5 x 8 size camera weighs only 3 lbs.

THE BEST PLATES ARE THE CHEAPEST.

SEEDS ARE THE BEST.

Have you tried our New **G. B. P. R. Plates?** By a simple process they develop six different tones. *Send for Circular.*

M. A. SEED DRY PLATE CO.,

ST. LOUIS, MO.,	Works:	NEW YORK, N. Y
2005 Lucas Place.	WOODLAND, MO.	57 East 9th Street.

We earnestly solicit correspondence with manufacturers of anything pertaining to the

PHOTOGRAPHIC TRADE.

American Photo Supply Co.

MEXICO CITY,

Calle de la Profesa No. 1, REPUBLIC OF MEXICO.

HALF-TONE WOOD LINE-PHOTO DESIGNING

GATCHEL AND MANNING

PENNA ELECTRO PHOTO-TYPE

ENGRAVING COMPANY

OFFICES 33 S 6TH ST. PHILADA

FACTORY 27 TO 41 S. 6TH ST.

PHOTOGRAPHIC TRIMMING BOARDS.

"IMPERIAL," A first-class Trimmer, with a TEMPERED Steel Knife, warranted.

"EUREKA," Made for customers desiring a Trimmer to retail at a low price.

MADE IN ALL SIZES.

We can quote **Rock Bottom** prices on above goods. Write us for circulars.

THE WORCESTER SUPPLY CO.,

Manufacturers of Photographic Specialties and Dealers in Supplies,

P. O. Box 168. WORCESTER, MASS.

Actien-Gesellschaft für Anilin Fabrikation,
Photographic Department,
BERLIN, S. O., 36.

DEVELOPERS:

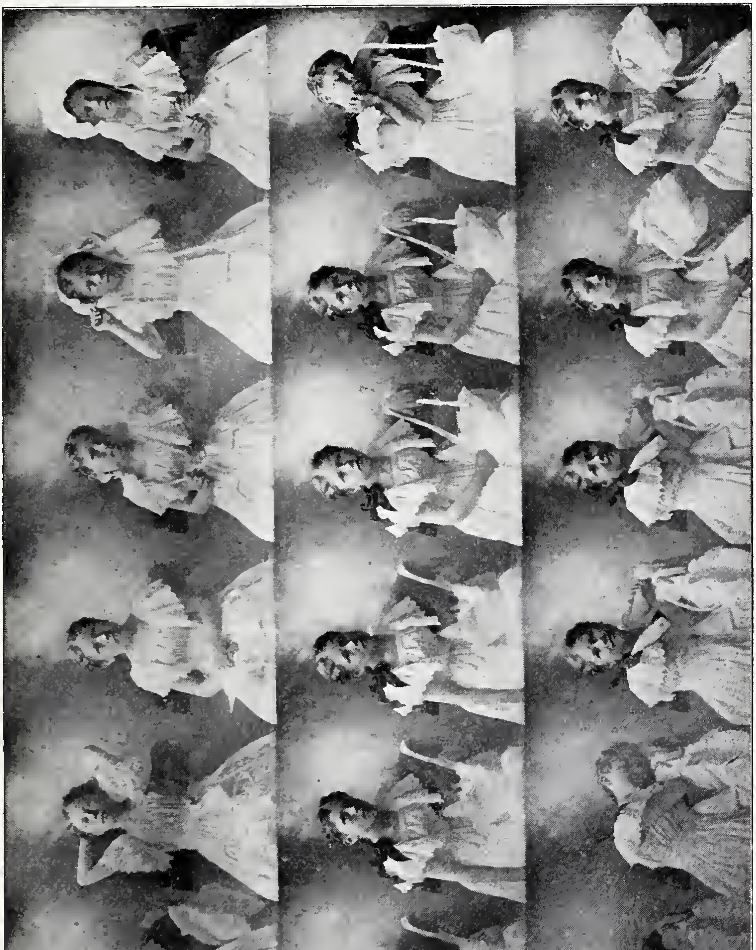
EIKONOGEN,
RODINAL,
AMIDOL,
DIOGEN,
DIPHENAL.

Sold by all Dealers. **Ask your Dealer for Formulae.**

Klay's Multiplying Plate Holder.

now making its tour of the world. In these days of American enterprise and push, a constant demand for "Something New" is being felt by photographers in every city and village, and that demand has now happily been supplied by the

KLAY MULTIPLYING PLATE HOLDER.



It is a unique patented device for producing from 2 to 28 different pictures on a single plate, $4\frac{1}{4} \times 6\frac{1}{2}$ or 5×7 ins. For variety, novelty, and convenience it excels all other devices for producing these small pictures. Any photographer who once sees the Holder and its work wants one immediately. The engraving shown herewith is proof of the efficiency of the Holder. If desired, some full-sized cabinet half-tones will be sent on application.

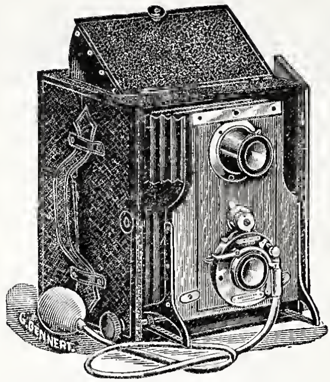
Will fit any 8 x 10 Studio Camera without alteration.

PETER DILLER,

Price of Holder, $15.00. Sole Owner of Klay's Patent, BLUFFTON, O., U. S. A.

HIGH-GRADE MONTAUKS

For
High-Grade
Results.

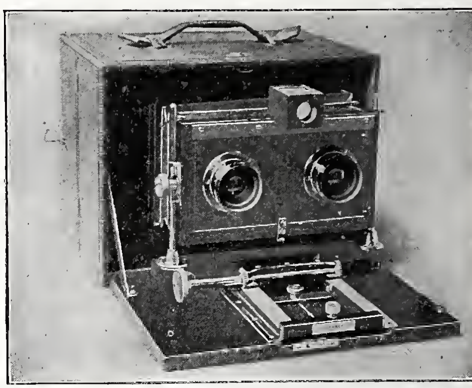


THE TWIN LENS MONTAUK.

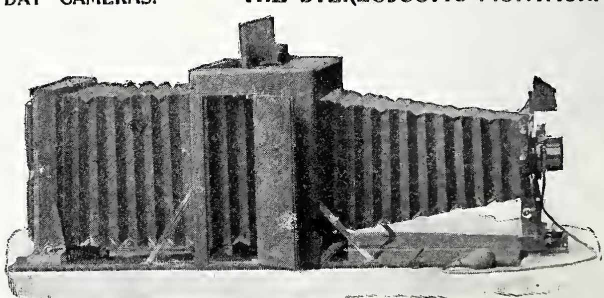
Fitted with
ROSS, ROSS-ZEISS, or
ROSS-GOERZ LENSES,
and...
COLLINEAR DOUBLE
ANASTIGMATS,
also...
ROSS-ZEISS
CONVERTIBLE
ANASTIGMATS.

Send for Catalogues.

HIGH-GRADE
GRAY DAY CAMERAS.



THE STEREOSCOPIC MONTAUK.



THE LONG FOCUS MONTAUK.

G. GENNERT, 24 & 26 East 13th St., NEW YORK.

ORTOL-HAUFF

PERFECT AND ONLY

SUBSTITUTE FOR PYRO.

It has all the advantages of Pyro, combined with non-staining quality, increased latitude in exposure, and great susceptibility to action of both restrainer and accelerator.

Supplied in Tubes, ready for use,

at the price of the powder in bulk. Per set of two tubes (1 Soda, 1 Ortol), making 40 ounces of the best two-solution developer known to science, by mail, - - - - - - 35c.

REGISTERED TRADE MARK

REGISTERED TRADE MARK

REGISTERED TRADE MARK

IN WINTER,

When gray days are legion, your under-exposed plates must be developed with

METOL-HAUFF

Metol Tubes, per box of six, for one-solution Developer, by mail, - - - - - $1.00

G. GENNERT,

24 & 26 East 13th Street, —— NEW YORK.

The "SIMPLEX"

PRINTING FRAME.

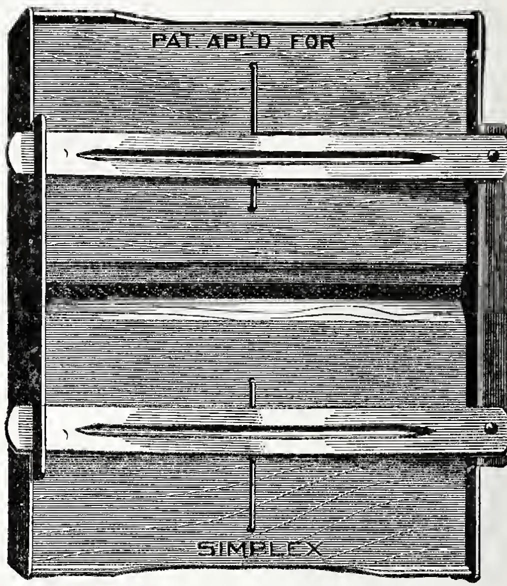
LIGHT,

COMPACT,

SIMPLE,

DURABLE and

INEXPENSIVE



The Frame is made of Japanned Iron, with Wooden Back, covered with Billiard Cloth.

IT SELLS ON SIGHT!

Prices as follows:

$3\frac{1}{4} \times 4\frac{1}{4}$, $3\frac{1}{2} \times 3\frac{1}{2}$,	24c.
4 x 5,	25c.
5 x 7,	32c.
5 x 8,	35c.

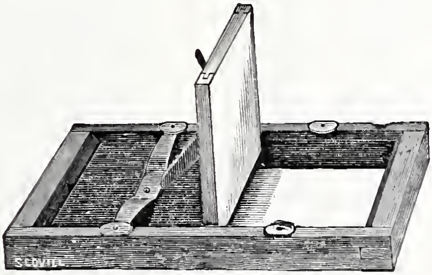
FOR SALE BY ALL DEALERS, AND

The Scovill & Adams Co. of New York,

60 & 62 EAST 11TH STREET, NEW YORK.

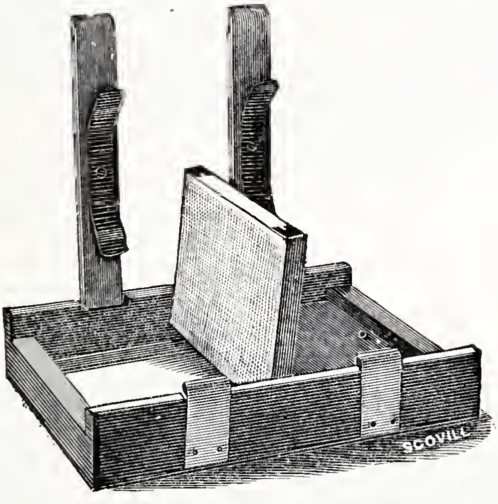
Scovill Printing Frames.

Manufactured of Cherry, with Brass Springs, Paneled Backs and Tally.



Scovill Flat Printing Frame (Open).

Our Printing Frames are constructed so that a uniform pressure is obtained, thus insuring perfect contact between the positive paper and negative plate. The back-boards are so arranged that the progress of the printing may be watched without danger of shifting the paper.



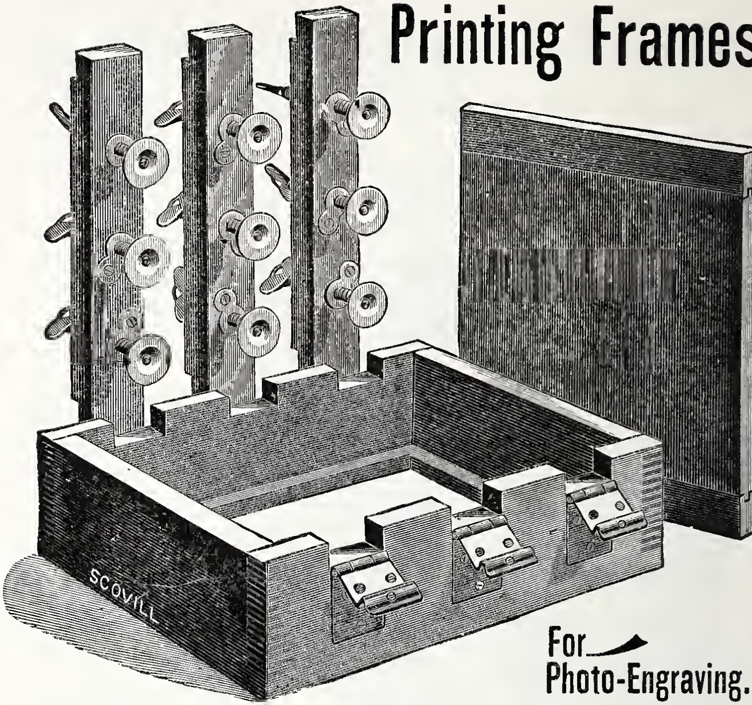
Scovill Deep Printing Frame (Open).

For Plates	Flat.	Deep.	For Plates	Flat.	Deep.
3¼ x 4¼	$0 36	$0 75	13 x 16	$2 05	$2 75
4 x 5	38	75	14 x 17	2 45	3 00
4¼ x 5½	40	75	16 x 20	3 10	4 25
4¼ x 6½	42	85	17 x 20	3 30	4 60
5 x 7	50	85	18 x 22	4 20	5 20
5 x 8	52	1 00	20 x 24	5 10	5 50
6½ x 8½	60	1 25	24 x 30	..	9 00
8 x 10	75	1 50	35 x 45	..	16 00
10 x 12	1 00	1 75	30 x 60*	..	22 00
11 x 14	1 85	2 50			

*Larger or special sizes made to order at short notice, according to specification.

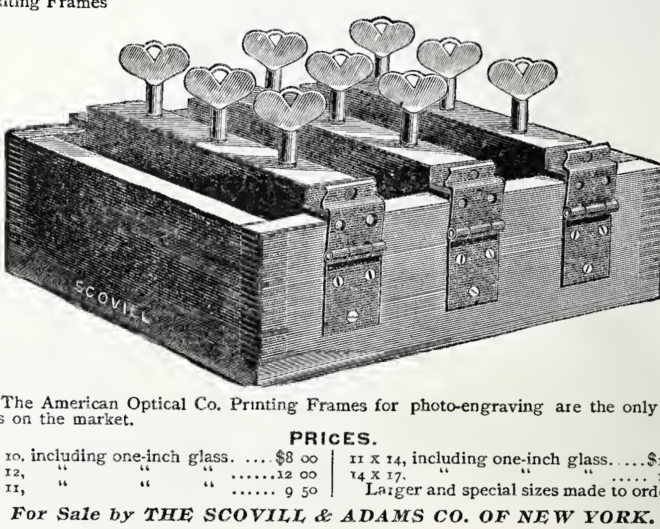
When made with backs to open lengthwise, ten per cent. is added to the foregoing prices for the respective sizes.

Printing Frames



For Photo-Engraving.

The Printing Frames made by the American Optical Co. for photo-engraving are like everything else manufactured by this factory, of the highest degree of perfection, and the utmost care was given to the comparative distance of screws so as to produce an even pressure. Many negatives have been either ruined or snapped by tne use of imperfect Printing Frames



The American Optical Co. Printing Frames for photo-engraving are the only safe ones on the market.

PRICES.

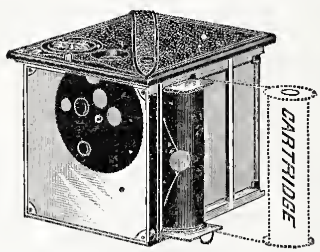
8 x 10, including one-inch glass. $8 00	11 x 14, including one-inch glass. $13 00
10 x 12, " " " 12 00	14 x 17, " " " 19 00
9 x 11, " " " 9 50	Larger and special sizes made to order.

For Sale by THE SCOVILL & ADAMS CO. OF NEW YORK.

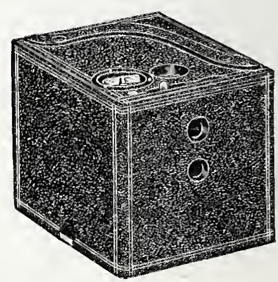
1899 MODEL

BUCK EYE Cameras

TRADE MARK



Showing Spool-Carrying Mechanism.



Thoroughly up to date, unique in mechanical arrangements, and beautifully finished.

The American Camera Manufacturing Co.

NORTHBOROUGH, MASS., U. S. A.

FOR SILVERING,

THE WATERBURY TRAYS ARE THE BEST AND CHEAPEST.

These Trays are made by the

AMERICAN OPTICAL CO.

which of itself is a guarantee of the superiority of the wood-work.

Canvas is not required for the seams, as the bottoms are seamless. The bottom rests on cross-strips—a great improvement, for steadiness, over knobs at the corners, which were liable to be broken off.

THE

Waterbury Trays

are guaranteed not to warp or crack.

PRICE LIST.

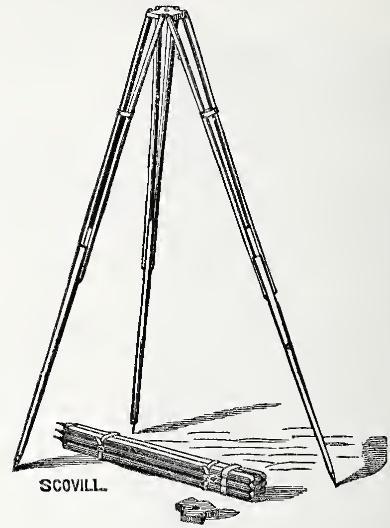
			Each.
15x19	Waterbury	Trays.....	$3 50
19x24	"	"	5 00
22x28	"	"	6 50
25x30	"	"	9 00

For Sale by all Dealers in Photographic Requisites, and by

THE SCOVILL & ADAMS COMPANY.

The Scovill Adjustable Tripod.

(FEATHER WEIGHT.)



Nothing more compact, certainly nothing as graceful in appearance and light in weight as the new Tripod for out-door Photography, just produced by the American Optical Company, has yet made its appearance. Because so readily adjusted to the utmost irregularity of the earth's surface, it was decided to call it the "Adjustable Tripod." Lady amateurs prefer it to any other pattern on account of its lightness and beauty. The top is covered with billiard-cloth to prevent marring the fine polish on our cameras, and the clamping screws are not detachable.

SCOVILL ADJUSTABLE TRIPOD.

No. 1..Price, each, $3.50
" 2.. " " 5.00

Scovill Adjustable Jointed Tripod, to fold and pack in a 22-inch Valise.............. $4.00

Do. with Canvas Bag and Handle.. 4.75

THE IMPROVED TAYLOR TRIPOD.

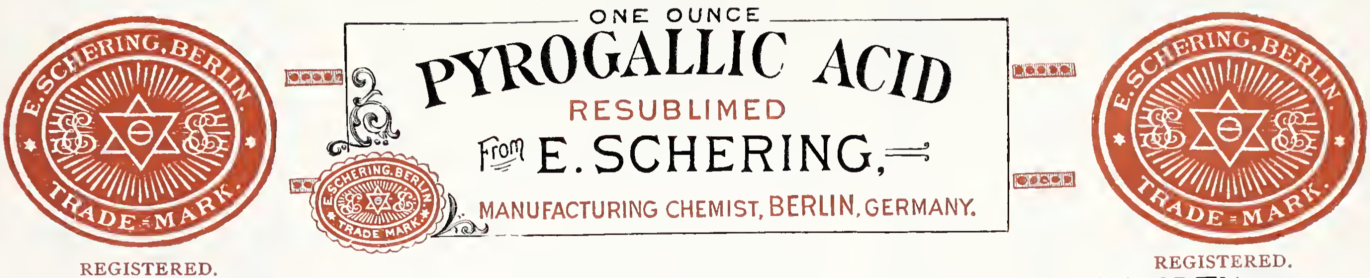
The illustration here presented makes an extended description unnecessary. Suffice it to say that this tripod is very firm when set up, and folds up compactly by simply pressing together the two upper joints of each leg, thus unsetting them from the pins on the brass top and then doubling them over on to the third joint. This movement is naturally reversed when placing the tripod in position to support the camera.

Price, with metal disc and non-detachable screw.......$2.25 each.

Adapted for cameras from 1-4 to 8x10 size.

When purchasing a Developer please be particular to specify **Schering's** the oldest and most favorably known brand.

Put up with labels and seals as per fac-similes here given.

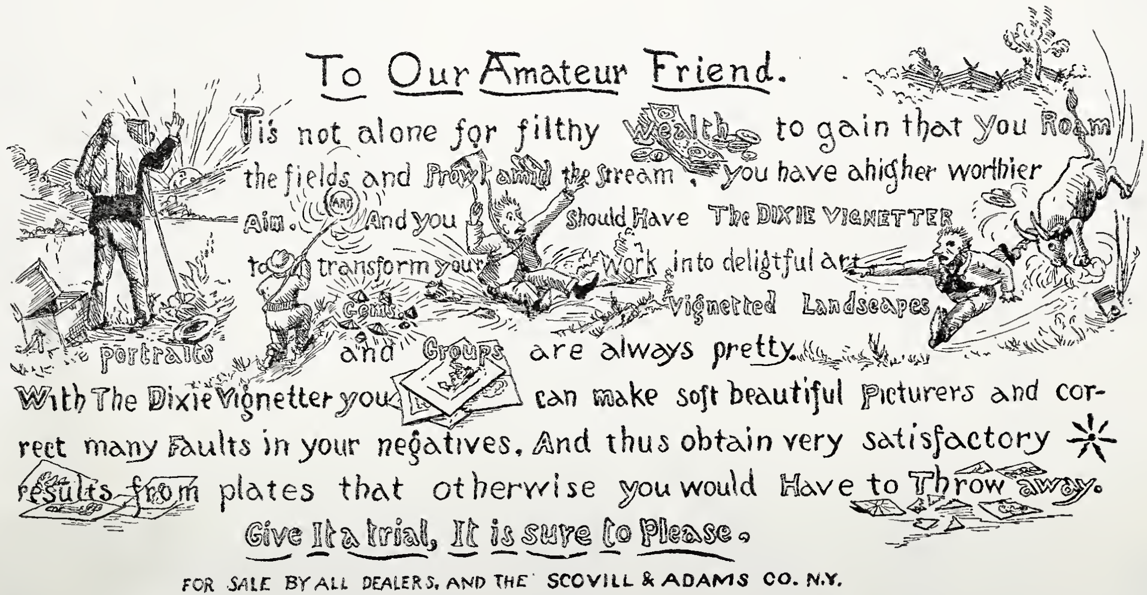


THE STANDARD OF THE LAST—THIRD—EDITION OF THE GERMAN PHARMACOPŒIA.

See that you get the Genuine "Schering's." Excelled by none.

Send Orders to your Dealers, or to

THE SCOVILL & ADAMS COMPANY OF NEW YORK,


To Our Amateur Friend.
'Tis not alone for filthy Wealth to gain that You Roam
the fields and Prowl amid the Stream, you have a higher worthier
Aim. And you should Have The DIXIE VIGNETTER
to transform your work into deligtful art.
Vignetted Landscapes
portraits and Groups are always pretty.
With The Dixie Vignetter you can make soft beautiful Picturers and cor-
rect many Faults in your negatives. And thus obtain very satisfactory
results from plates that otherwise you would Have to Throw away.
Give It a trial, It is sure to Please.
FOR SALE BY ALL DEALERS, AND THE SCOVILL & ADAMS CO. N.Y.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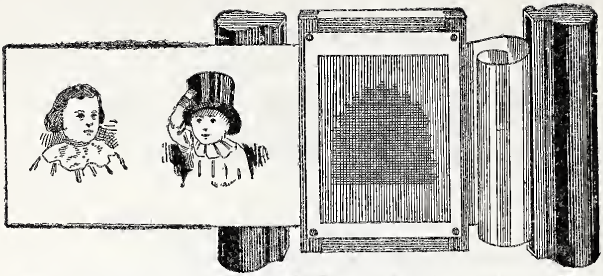

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PATENT APPLIED FOR.

ATTACH THE HOSE,
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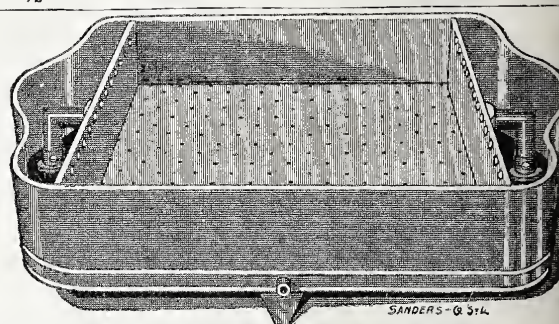

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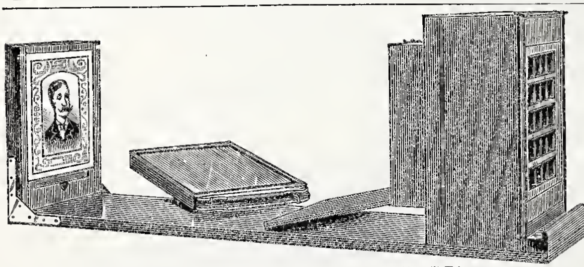

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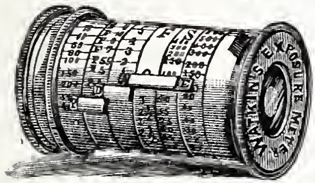

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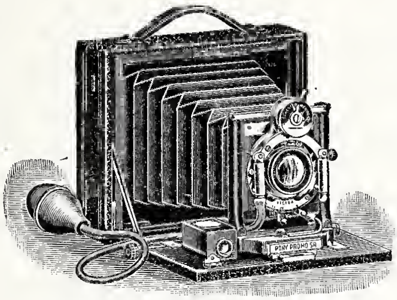

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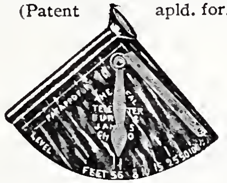

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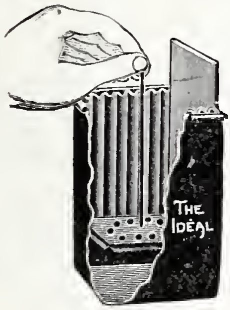

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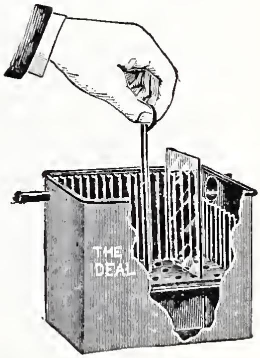

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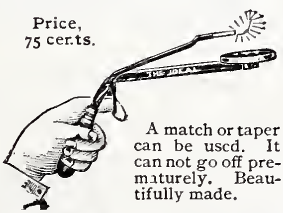

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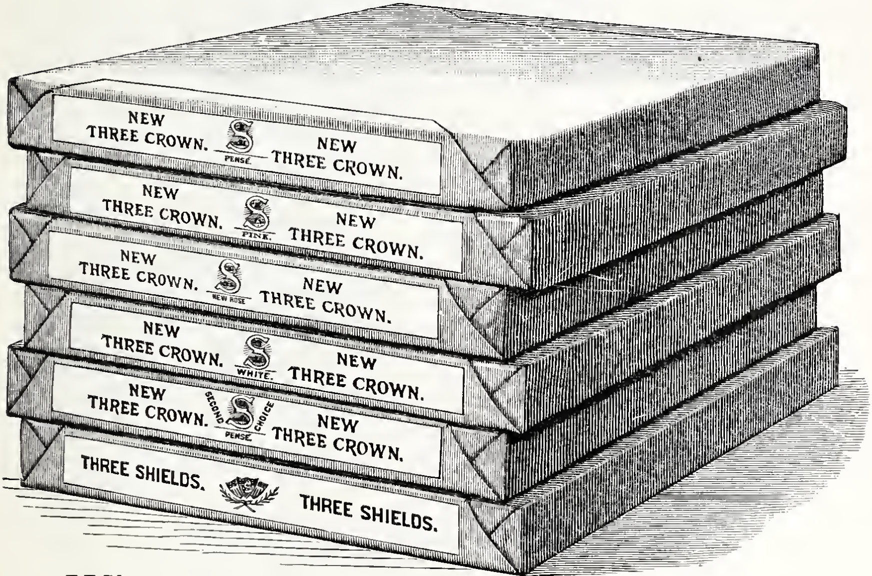

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